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RAT INFESTATION INSPECTION OF VESSELS

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Inspection of vessels to determine the presence and amount of rat infestation is not new; but, so far as the writer can determine, no detailed account of the methods pursued has yet been published.

DERATIZATION AND EXEMPTION CERTIFICATES

The international form for deratization and deratization exemption certificates provides space for recording the amount of rat infestation and the rat harborages present in the various parts of the ship. Neither certificate is regarded as complete unless there appears in this space, in specified detail, a record of these conditions as determined by careful inspection. It is the policy of the Public Health Service to prescribe that its quarantine officers issue only completed certificates and to insist that those presented to them be completely filled out, as a requisite for their acceptance. The purpose of this policy is to present quarantine officers with a complete and accurate picture of rat infestation, present or potential, on board the ship as an aid in safely arriving at an immediate decision as to the vessel's quarantine status.

By international agreement, deratization and exemption certificates, when properly and competently executed, are almost universally accepted. In order that their high status may be maintained, it has become extremely important that the inspectors should be competent and reliable.

PURPOSE OF INSPECTION

Inspection to determine rat infestation has two principal objects: One is to determine the presence or absence of rats; the other is to determine their location when present.

The import of the first of these is clearly recognized. Upon the presence or absence of rats is largely based the determination of whether or not the ship shall be fumigated.

The significance of the second object is not quite so obvious. It is, however, to secure information that is essential for the accurate evaluation of infestation estimates, for the effective application of fumigation, and for the institution and maintenance of rat proofing.

In respect to the latter two items, fumigation is very greatly improved by intensive treatment of infested harborages, while successful rat proofing absolutely depends on a knowledge of the location of harborages.

LOCATION OF INFESTATION

Infestation inspection as a guide to eradicative procedure is best shown by illustration. One case will suffice. On the steamship *C. L.* a very large rat colony was confined to the storerooms in the poop, where the rats inhabited extensive harborage in the insulation around a cold storage room. The first fumigation, unguided by inspection, killed many rats (253), but failed to eradicate the colony. Six months later the ship returned with a still larger rat colony in the same location. On this occasion preliminary inspection disclosed the inhabited harborage, which was torn open and directly fumigated, as a preliminary to the general fumigation. Such treatment resulted in better than 99 per cent destruction of the rats, all together over 600 being killed. The cold storage room and adjacent storerooms were rat proofed while the ship was still in port. When it again returned, several months later, careful inspection revealed signs of but slight infestation, this being borne out by the recovery, on fumigation, of only four rats. The concentration of activities produced results. The holds, found rat-free when inspected, required and were given, scant attention. They yielded no rats on either of the first two fumigations, though harboring all four of those secured by the third.

INFLUENCE ON PERIODIC FUMIGATION

Inspection to determine the presence of rats has a practical determinative bearing in the case of the ship fumigated at periodic intervals. The object of fumigations on such ships is to remove a potential danger inherent in the presence of a rat colony. If there is no rat colony, the danger does not exist. By inspection the rat infestation status is determined, and on this a decision reached as to whether fumigation shall be performed or shall be waived.

In the case of a vessel from a plague-infected port, the logic of the situation is no less real; but one hesitates to base treatment of a danger, much more nearly actual, on an inspection report that may be in error. The thought is that a fumigant gas is not subject to human frailties and therefore safer. Even in this case, however, world opinion is tending to rationalization of quarantine procedure and, except in extreme instances, to depend more and more on determinable factors as guides to treatment.

REMANDS AND OTHER QUARANTINE MODIFICATIONS

The rat infestation status of a vessel, as discovered by inspection, may have a determining influence on such questions as whether a ship may be remanded to another port for fumigation, whether fumigation may be waived, whether fumigation shall be required before the ship goes to dock, etc. Obviously, a heavily rat-infested vessel should be deratized with as little delay as possible; but one on which there is little evidence of infestation may be granted certain privileges with reasonable safety.

EVIDENCE OF INFESTATION

Having outlined the purposes and value of infestation inspection, we may take next a description of the procedure itself.

It is well to begin inspection with inquiries of the ship's crew. When they report rats, their testimony is nearly always reliable as to their presence, though totally unreliable as to actual numbers. One rat, seen many times by various members of the crew, may become 100 rats in the telling. On the other hand, little reliance should be placed on negative statements by the crew, except that consistently negative statements generally preclude a heavy infestation.

The signs of rat infestation are those produced by the rats themselves. They are, in the order of their frequency, as follows:

1. Droppings.
2. Runways.
3. Tracks.
4. Gnawing.
5. Live rats (actually seen by the inspector).
6. Dead rats.
7. Nests.
8. Rat odor.

LIVE RATS

Rats are not infrequently seen during inspection of ships. If for every one seen, 20 are estimated, the estimate will rarely be less than the actuality. If it is possible to make the inspection during a period of quiet, live rats are more likely to appear, particularly if the inspector will remain quite still for several minutes or longer. They may sometimes be run out of loose dunnage. They are occasionally seen in loaded holds recently opened. As a rule, however, when specifically searched for, they are likely to remain out of sight until their harborages are broken open. When, despite the bustle of loading or unloading, live rats are constantly seen in a hold, a heavy infestation is certainly present.

DEAD RATS

Old, dried carcasses of rats are definite signs of past infestation, but do not constitute evidence of present infestation. Bodies of rats which have recently died indicate present infestation, but are not positive evidence. If partly eaten, however, as is often the case, there is little doubt of the presence of live rats. Rats partly eaten by cats are badly mangled; those eaten by other rats are more cleanly handled, often the greater part of the viscera having been reached through a single hole through the body wall. As in the case of sighted live rats, the presence of dead rats usually indicates a heavy infestation. The presence of numbers of dead rats (10 or more), is almost invariably associated with a heavy infestation, unless recent destructive procedures have been carried out or an epizootic is in progress.

It is well to remember that the presence of dead rats may be due to infection with bubonic plague.

DROPPINGS

This is the most constant sign of rat infestation and the one on which inspectors most rely. In the following pages the reader will find its importance repeatedly emphasized.

Like that of other rodents, the excreta of the rat is in small firm masses. These are rod-shaped, straight or slightly curved, with rounded ends. In size they vary from one-fourth inch long by one-sixteenth inch in diameter to three-fourths inch long by one-fourth inch in diameter. Nearly always they are quite dark or black in color. When freshly passed they are soft enough to be squeezed out of shape and often have a glistening, wet appearance. Within two or three days they dry and become hard. Later the surface becomes dull. Very old ones are dust or dirt covered, and may be discolored.

The size, consistency, number, and even the color of droppings may vary considerably with variations of food. Rats under observation have been noted to pass as few as 30 and as many as 180 droppings in 24 hours. In general, grain as food produces relatively few while the more moist foods, and those with much roughage, produce more and often larger droppings.

Droppings from *R. norvegicus* are larger than those from *R. rattus*.

Droppings from mice resemble those from rats in shape and color, but are distinctively smaller in size.

Rat droppings are passed singly at relatively frequent intervals. Consequently, though they may occur in considerable quantities within small areas, their arrangement is haphazard; they are not seen in small piles or grouped together, as is the case with some of the other rodents. They will be found wherever the rats roam, which is every-

where, but will be in greater numbers along their runways, near their harborages, and in secluded corners. They will be found in greatest numbers in places seldom cleaned or disturbed, such as the tops of partly inclosed tanks, the small shelves formed by the angle braces at bulkheads, the spaces between ribs, under boatswains' stores, under extra propellers, inside of pipe casings, and in similar locations. In infested loaded holds, droppings will always be found, in some measure, scattered over the cargo—strange to say, often in greatest amount directly under the hatch. The writer has never known this to fail, and will unhesitatingly deny the presence of rats in a loaded hold where droppings are not found on the cargo.

RUNWAYS

All colonizing animals establish runways. These are merely the usually traveled routes from one frequently visited locality to another. The constant passing of many individuals, each leaving a mark, finally produces a well-worn track, obvious to any eye and often giving a great deal of information to the experienced one. The body of the rat is dirty and the hair a trifle oily, so that wherever it rubs against a wall, climbs a pipe or angle iron, or swings under an obstruction, it leaves a dark mark. These marks are built up and extended by the constant passage of rats, the runway finally becoming clearly delineated. An experienced observer will detect a runway used by but few rats; runways used by many are plain to the most unobserving, though the unknowing may not realize their significance.

The ship rat prefers to travel overhead; and so, on account of this predilection, the most characteristic runways are those along overhead beams, particularly when these are interrupted at intervals by cross beams resting on them. It is at the points of contact that the rat marks its route; for, in swinging under the interrupting cross beam it makes a roughly semicircular mark below it, such a mark appearing under each cross member. Other locations may be the free edge of an angle iron, a pipe, an electric cable, the top of sheathing, as well as some less frequent routes.

Runways may be anywhere, but the best place to look for them is where one would never think of looking. The truth of this paradoxical statement may readily be verified by placing an experienced inspector and a neophyte on the same ship. The former will soon have spotted every run on the ship; the latter will take a month to find them all. This is partly due to man's instinct to direct his eyes to the ground, while the runways are mostly overhead; but also it is in part due to the secretive instinct of the rat, which leads this animal to keep even its runways hidden. For example, if a runway is up a pipe in a corner, it will not be up the side toward the room, but the side turned to the corner. Similarly, if along a telegraph casing, it

will generally be along the inside, that is, inside the casing, which must either be opened to reveal it, or else followed, literally inch by inch, to discover the openings for entrance and exit. Exactly such a procedure was required on one ship to locate a gas-proof harborage, in which rats had escaped through twenty-odd fumigations. A tedious search along a telegraph casing finally was rewarded by the discovery of a hole on top, directly below an electric cable. Along the cable a very heavily marked runway was visible for just 6 inches, when it disappeared into a 2-inch steel conduit, leading off from a 6-inch conduit, also steel, up to that time totally unsuspected as a rat refuge.

As a rule, runways are routes from one inclosure to another, or else from a harborage to a feeding ground, less often a general route connecting several inclosures. With this in mind, one looking for runways will endeavor to locate openings through partitions, when the runways leading from them on either side become apparent. Conversely, a runway spotted will, when followed, lead to an opening or to a harborage.

Runways are of the utmost importance to the rat proofer, since they show him where to place a barrier and where the harborage that must be closed or removed is located.

TRACKS

Like any other animal, rats leave tracks; that is, they leave tracks on soft surfaces. At first glance one would expect on a ship few soft surfaces; the steel decks certainly are anything but impressionable. However, there are such and their inspection will repay the inspector tenfold in time saved, for the total absence of rat tracks on impressionable surfaces is, next to absence of droppings on cargo, the most reliable of negative evidence.

The most constant impressionable surfaces on ships are found in the dust that collects on the upper surfaces of the battens along the sides of the holds, in the coal dust on the floors of bunkers, and in bulk cargo. On these the rat leaves a literally tell-tale trail, for the trail of its tail is as characteristic as the marks of its 4-toed paws.

In light dust the marks of the toes may be quite clear. On such a surface the dragging tail may also leave an irregular wavy line, though this is not constant and is often a broken track. The rat drags its tail only part of the time, usually only when moving slowly. In coal dust, care must be taken not to mistake the marks made by the edge of the coal shovel for tail marks. The former are quite straight while the latter are wavy.

Rat tracks along a batten can not be taken as positive evidence of the presence of live rats but evidence only that rats have been present, although if more than two weeks old they are usually discernibly obscured by fresh accretions of dust. Tracks on the floor of a bunker

can be taken as reasonable evidence of present infestation. Tracks on cargo are quite as positive as the presence of droppings, and their complete absence from bulk cargo is quite as reliable negative evidence as the absence of droppings. The complete absence of rat tracks in coal bunkers and on battens is, as has already been stated, excellent evidence of the absence of rats; but, to be taken as such, they must be carefully searched for—a rapid or cursory glance is not sufficient.

Occasionally rat tracks are seen on hard surfaces. An exceptional instance was due to rats traveling through wet coal dust so that they left clear-cut tracks and tail marks on the surface of a door, painted white, at the point where they balanced on the edge to jump to a beam above.

Illuminating tracks.—Rat tracks are often quite shallow and hence almost invisible when illuminated from above. With side lighting, however, they stand out clearly. In coal bunkers this method is most essential, but it makes the tracks stand out more clearly in any location, including bulk cargo.

Rat tracks on thin surfaces over hard bases, as along a batten or on the floor of a bunker, generally show the marks of the separate toes, but tracks in thick dust or on bulk cargo are usually only regularly spaced little pits, or craters.

GNAWING

Rats gnaw for three purposes, viz, to cut through an obstruction between one inclosure and another, to cut into a food container (actual or expected), and to eat. The first includes cutting a way into harborages, out of spaces in which the rat may be caught, and through partitions or similar barricades. The second comprises cutting into cargo or stores containers. The third includes cutting through the outer shell of some foods as well as their actual eating. Gnawing is always purposeful; it seldom even appears to be at random. In fact, as a rule, it is quite obvious what the rat was trying to accomplish.

These three types of cuttings have each a somewhat different significance according to the definiteness with which they can be dated. In the first instance they may indicate only past infestation which may or may not have disappeared, as indicated by other signs, although in the case of present infestation careful inspection will usually uncover some definitely recent cuttings. In the second instance, cutting of cargo or stores containers, the date of occurrence can usually be assigned within narrow limits. The time of stowing cargo is of course precisely dated, while provision stores are subject to fairly constant inspection. In the third instance, the date may be quite precisely assigned or may be hopelessly indefinite. When fresh foods are partly eaten, the date can usually be very closely calculated, partly because fresh foods are stored, as a rule, for short periods only, and partly because, on them, cut surfaces soon lose their fresh appear-

ance. When dry foods, particularly grain, are partly eaten, however, the date may be quite indefinite. On one hand the appearance of the grain may not change in months, and, on the other, grain sweepings may remain in the corners of ships' holds for long periods. When sweepings can be assigned definitely to a specific voyage, the cuttings may be dated within its limits.

Cuttings in fresh foods lose their fresh appearance within 24 hours, the cut surface drying and becoming discolored, while the edges tend to curl over it. Cuttings in fresh apples acquire a brownish discoloration within one or two hours. Cuttings in wood may present a fresh-appearing surface for a week or more unless rats have been passing over it, smearing the surface with grease and dirt from their bodies. Very recent cuttings in wood are associated with quite obviously chewed-out bits of wood. In a few days these tend to become scattered, lose their fresh appearance, and become dust covered, so that they merge more or less into the background. Recent cuttings of bagging, rope, baled goods, and the like are usually associated with the presence of frayed bits of the fabric.

The marks of a rat's incisor teeth are quite characteristic (in the absence of other rodents) and easily recognized. When eating from a large piece of food, the rat has a tendency to cut a hole and eat from the inside of the hole, sometimes scooping out a recess that it can get bodily into. The writer has seen a large watermelon entirely eaten out inside, leaving a complete shell with a single rat hole at one end. In eating grain, the rat invariably eats out the soft central portion of each kernel, discarding the rest. Grain weevils have the same habit, but they enter at the point of the grain and hollow it out from the inside, leaving a thin shell, while the rat bites straight through from side to side.

Rat gnawing is of great service in estimating the numbers of rats. A few old cuttings suggest but few rats. Numerous fresh cuttings suggest a large and growing colony expanding into more extensive quarters. On banana-carrying ships the amount of droppings is a very poor guide to an estimate, but the amount of fresh cutting into harborages is usually quite reliable evidence. Extensive rat damage to cargo is always the sign of a heavy infestation.

NESTS

Ninety per cent of rat nests are located inside of protective harborages. The other 10 per cent are built between, under, or inside pieces of cargo, or (a very small proportion) in corners of the deck. In consequence of such location, nests are not always seen during the course of an ordinary infestation inspection. As a rule, they need not be specifically searched out, unless other evidences of rat life are confusing so that the inspector finds it necessary to check against the presence

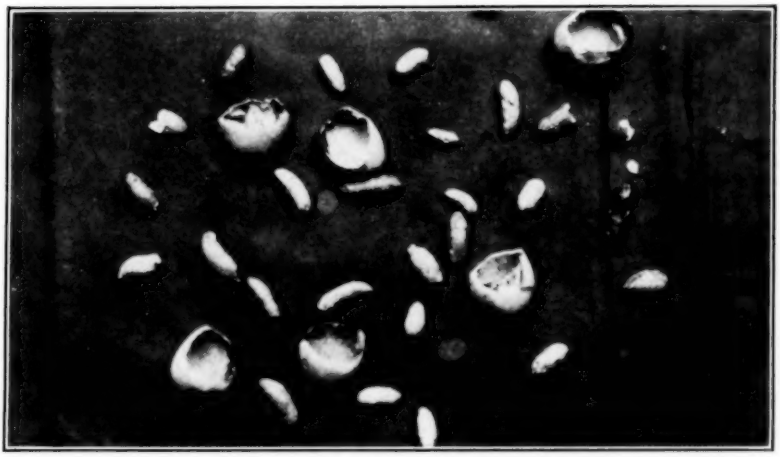

FIGURE 1.—Rat droppings of a white color due to eating the pithy shells (also shown in the picture) of a variety of oriental nut (approximately one-third reduction)

FIGURE 2.—Typical scattered arrangement of rat droppings on top of a water tank

FIGURE 3.—Rat tracks and dragging tail marks (right foreground) in bulk linseed

FIGURE 4.—Footprints and tail marks on a metal door made by rats after walking through wet coal dust. Rats balanced themselves here to jump to a hole through a partition

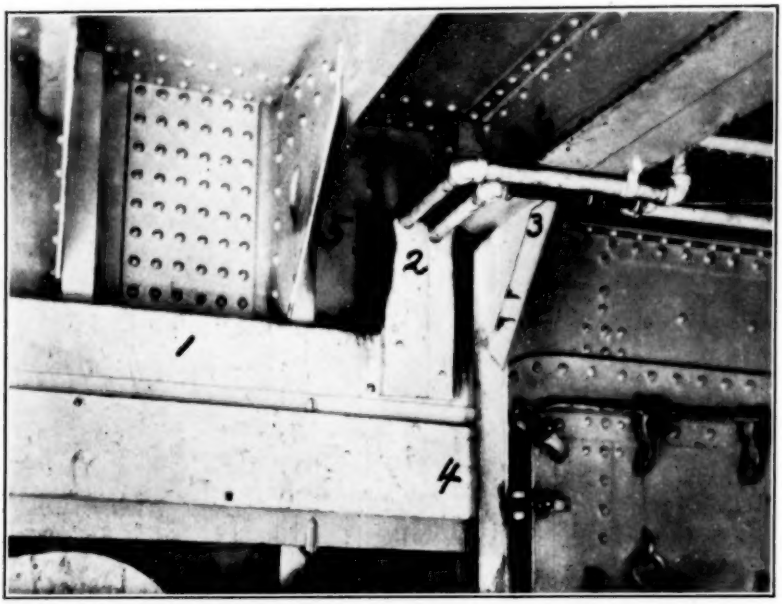

FIGURE 5.—Main road and three by-ways. Main rat run along top of wooden sheathing *1*, up the edge of vertical pipe support *2*, along the two pipes and under the main beam along the inner pipe *3*, heavily blackened on underside by rats crawling along it upside down. The run continues along this inner pipe to another compartment. The by-ways are up the edge of the angle iron at right center *4*, down the edge of angle iron at left center *5*, from crossbeam above, and from horizontal portion of main beam onto the pipes *6*

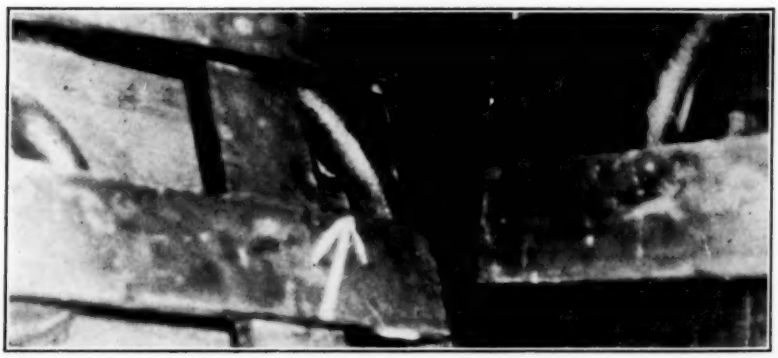

FIGURE 6.—Cold-storage insulation. An almost completely hidden rat hole under the angle of the pipe just above arrow

of nests and other signs inside of harborages. It is much more usual for the fumigators to uncover nests in the course of opening harborages to insure the entrance of gas.

Sometimes, however, the presence of nests can be reasonably determined by the appearance of bits of rubbish projecting through cracks in a casing or out of a rat hole. Nests in boatswains' stores—a frequent site when these remain undisturbed over considerable periods—may often be uncovered without too much labor. Nests under cargo are generally in plain sight (unless destroyed by stevedores) after the cargo has been removed.

The particular value of the discovery of rats' nests is both as corroborative evidence of the presence of rats and as evidence that breeding, and hence colony building, is taking place. Furthermore, in and near the nests are places where one expects to find fresh droppings. The presence only of old droppings about the nests is evidence that the rat infestation has disappeared or that the nest has been abandoned.

Rats' nests may be constructed of almost any soft material; the rat is not at all particular in this respect. It is common to find a much larger collection of material than is necessary for construction of the nest. In many cases this represents old nests, successively built one on top of the other. In other instances, however, it is a protective and secretive maneuver, the nest being in the center and accessible only through a single narrow opening. Sometimes the nest is simply hollowed out in an already existing collection of soft material, such as a pile of oakum, a bag of rags, etc. A favorite trick is to construct a nest between the coils of a stored hawser, parts of which are cut out to serve as nest lining. Hawsers are totally ruined in some instances.

It is sometimes easy and at other times quite difficult to determine whether nests are old or recent. An old nest is generally somewhat out of shape, while a new one is neatly rounded out and pressed on the inside. The age of droppings nearby is a guide, as is sometimes the apparent age of the materials entering into the structure and of remains of food scattered about. Young rats in a nest obviously denote recent construction as well as the presence of parents.

The numbers of nests are fair guides to the extent of the infestation. A single nest may represent but one pair of parent rats and their progeny, in all not over 10 or 12; but several fresh nests will generally represent from five to ten times as many rats as nests. Nests are sometimes exceedingly well hidden, so that in the presence of a considerable colony the inspector may locate only one or two or no nests. Occasions have been noted where as many as 30 rats have been taken from a ship on which painstaking search failed to reveal a single nest.

RAT ODOR

The odor of rats is distinctive and characteristic. It is of a musty character, but, like all odors, can not be described accurately enough to be recognized therefrom. Unfortunately, it tends to persist for a considerable period after the rats are gone, so that it can not be classed as a positive indication of their presence. It is of value, however, as often giving to the inspector information that rats have been present, and thereby intensifying his search for other evidence. Rat odor may permeate an entire hold, when it suggests a heavy infestation, or it may be discernible only inside a casing, or only immediately about a nest. It is rather commonly noticeable in rat-infested storerooms. Alone it is of little value as evidence, but coupled with other signs it may help materially in locating infested compartments and in estimating the number of rats. Individuals vary considerably as to the acuteness of the sense of smell, and hence, vary in perception of this sign.

LOCATION OF INFESTATION ON CARGO VESSELS

The localities most often infested by rats differ somewhat on cargo vessels, tankers, and passenger ships. Conditions and methods of procedure on cargo ships will first be described, and then the other types will be compared with these.

On cargo ships the preferred harborages are, in order of frequency, the holds, the bridge deck, the bunkers (on a coal-burning ship), the poop (when used as a storeroom), the provision storeroom, the forepeak, and the crew's quarters. Locations less frequently infested are the lifeboats, the fire and engine rooms, the officers' quarters, and the galley.

On the great majority of rat-infested cargo ships, rats will occupy one, some, or all of the holds, including the bunkers and bridge deck under this designation. On most of the other infested vessels they will be found confined to a single compartment or a definte unit of the ship. Most often this is the poop, when used as a general storeroom. Occasionally infestations occur only in the provision storeroom, or only in the forepeak, or only in the lifeboats, etc. On a very few ships, several superstructure units are infested in the absence of any infestation in the holds.

In the holds of the average cargo vessel, the harborages can be rapidly located and examined. Usually they are limited to pipe casings and raised flooring in the lower holds, pipe casings and overhead telegraph casings on the 'tween deck or shelter deck, and dunnage and stored machinery on any level. In the lower holds of some ships are ballast boxes or ballast along the keel, and in some (in the after holds), sheathing over the shaft alley. Fruit-carrying

ships always have a wooden sheathing covering all metal surfaces, while ships carrying perishable goods have one or more cold-storage holds or parts of holds. Bunkers are essentially holds. In them harborage is nearly always in pipe or telegraph casings.

When the poop is used for storage it is common to find it cut up by wooden partitions into varying sized spaces with double walls, sheathing against the side of the ship, and raised flooring. Here are frequently stored seldom used hawsers and cables, all manner of boatswain's stores, block and tackle, rigging, and junk. Not infrequently one or more compartments will be used for storing provisions, while on some ships one may find chickens, pigs, or even a cow or two. Exceptional harborage in the closed space over and around an ice box will be found in some cases. Sometimes only a small part of the poop, generally the afterpeak in such cases, is used for storage. As a rule, below the poop are tanks; but in some ships the storeroom is thus located, being entered directly from the space above or, by a separate small hatch, from the deck.

Provision storerooms may be in the poop, or in the bridge or shelter-deck space immediately below the officers' quarters, or below the galley. Very rarely is it in any other location on a cargo vessel. When inclosed by steel walls, as is often the case, it is rarely rat infested, but when the partitions are wood infestation may be expected. Harborage in them is usually restricted, so that the rats are likely to be living in, between, or under the stores, or are living elsewhere on the ship and invading the storeroom only for food. Infestation is usually quite obvious from droppings on the shelves. Runs are generally plainly marked, owing to the practice of painting the walls and fittings white. As a rule, only a few rats inhabit any given storeroom; but exceptions are sufficiently numerous that heavy infestation should not cause surprise.

The forepeak may open directly onto the weather deck, in which case infestation is unlikely, it may open into a relatively open space under the forecastle head, or it may open into crew's quarters located in the bow. In either of the latter instances infestation is not improbable. As a rule the chain locker opens into the forepeak or into the same space as the forepeak. Sometimes it, too, is infested. Usually the forepeak is two decks deep, a water tank occupying space below the second deck, but one going clear to the keel may be found at times. Nearly always forepeaks are used for boatswain's stores, much of which may be reserve stock seldom moved. As a rule, this stored material and the chains (in the chain locker) constitute the only harborage; but it may be quite sufficient for many rats, though more than 20 in a forepeak is rare.

The crew's quarters, in the vast majority of cargo ships, is either in the bow under the forecastle head or in the poop. When in the

former location harborage is likely to be quite limited, but in the latter case sheathing over the ship's sides is the rule. In either location, however, it is rather seldom rat infested, though the habits of the crew in bringing in food may attract visits of rats living in some near-by compartment. This is more frequent aft than forward. Because droppings are more frequently removed, rat infestation is usually more difficult to detect here than in other locations.

The lifeboats are sometimes rat infested, but harborage in them is rarely extensive.

Engine and fire rooms are located in the center of the ship (very rarely in the stern). Nearly always they are separated from the remainder of the vessel by steel bulkheads, as a rule impervious to rats. While harborage often exists in them, it is seldom extensive. Infestation of engine and firerooms alone is so extremely rare that it is standard practice to omit them from inspection when the holds are found rat free. Occasionally rat infestation occurs among engineers' stores in the shaft alley. Rats living in the bunkers and holds sometimes visit the engine and firerooms for water but seldom remain. An exception should be noted in the case of vessels in the shipyards, particularly if their stay has been protracted, in which case rats may invade the engine and firerooms in numbers in their search for food or warmth or because driven out of other parts by continuous activities of workmen. Several such instances have been noted.

On cargo vessels it is quite rare to find galleys infested, which is quite the reverse of conditions on passenger ships. The galley is nearly always on deck and almost totally devoid of harborage. It is also the scene of almost continuous activity for a large portion of the 24 hours in the day.

INSPECTION PROCEDURE ON CARGO VESSELS

Inspectors should have a definite routine. This accomplishes two purposes: It insures maximum speed and obviates missing some compartments.

The inspector's equipment consists of a suit of overalls and a flashlight. The overalls are not always required, though never out of place, but the flashlight is indispensable. A fairly accurate inspection may be accomplished without coming in contact with dirty surfaces, particularly on rat-free ships; but a thoroughly complete inspection can not be made on a rat-infested vessel without thoroughly soiling one's clothes if not protected by overalls. If pipe casings are to be opened a jimmy or short crowbar is required.

The usual procedure on cargo ships is to begin forward and work aft, excepting the engine and fire rooms and all superstructure above the weather deck, then returning to inspect the superstructure (and the engine and firerooms when indicated) from aft forward, ending

with the officers' quarters. The inspector examines first the compartments under the forecastle head, including forepeak, chain locker, paint locker, storeroom, and crew's quarters (if located here). Next the forward holds are taken in order, then the midship hold and bunkers, then the after holds, following which the poop and afterpeak are inspected. Returning, he inspects the engineers' quarters and (when indicated) the engine room and fireroom (including the shaft alley); following these the galley and the line officers' quarters, which latter usually include the pantry and storeroom and the chart room and wheelhouse. Finally, the lifeboats, potato locker, and potential harborages on the open deck are inspected.

MINUTIÆ OF INSPECTION

In general it may be taken as axiomatic that rat signs are in out-of-the-way places, so that they must be searched for or must be uncovered. If rat signs are obvious, the infestation is heavy. On an empty ship, however, it is well to remember that the holds are nearly always swept up after unloading is completed, so that much (at times nearly all) rat evidence may have been removed in the process. Occasionally the ship's crew endeavors to remove or cover up rat signs, even to the point of painting over runs and covering rat holes, as well as sweeping up droppings.

On coming into a compartment the inspector first flashes his light over the floor, looking for obvious signs; then he examines the overhead structures for rat runs. What he sees in this first look may largely guide further search. Next he looks for harborages, and notes their location. The following step is to pry into all corners, both on the floor and at higher levels, open lockers, move dunnage and light stores, etc., look along ledges, along beams, examine dust collections, examine the angles for openings and the borders of all wooden partitions for rat holes. Then he carefully inspects harborages to note whether they are accessible and, if so, whether they show signs of occupancy, and finally traces rat runs into harborages or into adjoining compartments. If there are stored foodstuffs, they are inspected to note cutting of containers or partly eaten food.

Forepeak.—In the forepeak, droppings are the prime evidence. They are most often on the shelf that is set into the point of the bow, next in frequency in the after corners, and next on the side shelves or along the borders of the floor. Often they will be found in the folds of stored canvas articles, as windsails, etc., and often under stored material. In the chain locker a steel shelf, commonly found on the outer wall on either side, is the most common site for droppings. Nests may be found in stored materials, such as bags or piles of oakum, in the folds of canvas, the coils of rope, or in the

angles of the deck under seldom-moved stores. Runs may be noted usually up the edges of angle irons; they may point the way to openings into the crew's quarters or into the hold. If the upper level of the forepeak is free from signs, it is unlikely that any will be found lower; but this does not always hold true, so that at least the next level should be inspected.

Under the forecastle head runs are likely to be a more prominent sign than in the forepeak. This holds true whether the crew's quarters are located here or the space is used for stores. If there are food stores, such as a potato bin, a run is likely to lead into it. Cut potatoes are usually readily distinguished and may be the first sign noted. In addition to the types of places mentioned in the forepeak, droppings may be found on top of lockers and on the ledges formed by flat portions of overhead deck beams. Where there is sheathing, rat holes, leading to the space behind the sheathing, are most likely to be found in corners out of ordinary sight range. The most usual locations are in or over lockers or under permanent seats. Rat signs are very rarely found in paint or lamp lockers, which are usually small, steel-walled rooms.

Holds.—In cargo holds there are nearly always at least two levels, the 'tween deck and lower hold. One or more additional levels may be constituted by additional 'tween decks or by a shelter or bridge deck. In some small ships the 'tween deck may be missing.

Droppings in holds.—In the holds, droppings constitute the most readily discovered sign. On a heavily infested vessel they will be in evidence everywhere, often first seen right at the foot of the ladder by which the inspector descends (rats regularly use the ladders as runways between the different levels). When infestation is light, the discovery of droppings may require painstaking search.

On the 'tween decks droppings are most numerous along the borders of the deck, principally in the spaces between the ribs, in the corners, along the bulkheads, and around the hatch coaming. They may often be found around infested casings, along the battens, and on the horizontal portions of overhead beams. The heavy beams running fore and aft just outside the hatchways are often favorite runways and may exhibit tremendous collections of droppings. The fresh-water tanks, usually on the shelter or bridge deck, may exhibit on their tops (often inclosed) considerable collections of droppings. Beneath extra propellers and other spare machinery parts (often stored on the 'tween deck or shelter deck) are other likely spots, as are collections of boatswain's stores. Dunnage piles should never be overlooked, as droppings are frequently found on or under them.

In the lower holds, droppings should be looked for along the borders and particularly on the triangular horizontal braces in the angles

between the ship's sides and the bulkheads and on the upper surfaces of the fore and aft beams, of which there are usually two on either side between the bilge and the deck above. These can readily be reached by climbing up the battens. Droppings may be found around the pipe casings, which in the lower hold may be horizontal along the floor as well as vertical, or in the bilges, though in the latter only when they are dry. They are not uncommon under the floor; but to see them in this location one must usually raise one or more boards.

In loaded holds, droppings assume a determinative importance. Droppings on the cargo must have been left after the cargo was put in place, and so they are positive evidence of present infestation. Further, since the length of time the cargo has been in place is known, the number of droppings thereon present a relatively exact basis on which to calculate the numbers of rats. On the other hand, the total absence of droppings on cargo is absolute evidence that there are no live rats in the hold. An interesting practical observation is that, when present on cargo, a disproportionately large number of droppings are often observed directly under the weather deck hatch.

Harborage in holds.—In the holds the available harborage may give an immediate clue as to the possible extent of infestation. Total absence of harborage, or only harborage that can be demonstrated to be uninhabited, is, with few exceptions, associated with few or no rats. Most of the exceptions are in the cases of vessels engaged in extraordinarily rat-attractive trades, such as the grain trade between certain South American ports and Europe, the grain trade between Karachi and other oriental ports, or the coasting trade between Java and associated islands, or in the cases of ships that have taken aboard a sizable rat colony in the course of a single voyage, as sometimes occurs on trips to the east coast of South America, to Africa, or to the Orient. On the other hand, extensive harborage, with many runs and rat holes leading into it, is presumptive evidence of a large colony.

Pipe casings and telegraph casings are the usual harborages on all levels. The latter are nearly always overhead on the 'tween deck or shelter deck, run fore and aft and, because they frequently pass through two or more holds and into other compartments, may be the route of widespread dissemination of infestation. When a telegraph casing is discovered to be a runway, it must be inspected throughout its entire length to discover the various entrances and exits; usually these will be on top, or in corners so remote from view as to require the most remarkable contortions by the inspector to enable him to see them. Telegraph casings are one of the routes opening into the engine room, and so, when the casing is infested, its engine-room entrance should be inspected for runways leading into it.

In the lower hold there is often a heavy wooden flooring for the protection of the tanks that are usually built over the keel. On

some ships this is close to the underlying steel surface and the space below is inaccessible to rats, but on most vessels it is placed on 2-inch battens and, hence, offers to rats extensive harborage in the form of a series of spaces between each pair of battens, each space the width of the hold long, about 2 feet wide, and the height of the battens (2 inches) high. These spaces open into the bilges at either side so that their presence is most readily determined by removing a limber board, lying flat on the floor and, by leaning part way into the bilge, looking back under the floor. From this position it can be noted at once whether rats have burrowed runways through the dirt and débris that nearly always collects. Such runways will usually follow the battens and can often be illuminated (by the flashlight) from the bilges for a distance of 8 or 10 feet. Droppings may be seen, or the inspector may find himself face to face with a startled rat. It is not uncommon to find oil (from leaks in the tanks when these are used to store fuel oil) under the floor. In such cases no rats will be found there; but it is well to remember that sometimes the oil may not cover all the surface under the floor and that rats may be in the sections where it is absent.

Rat holes leading into the space under the floor are most common along the bulkheads or at the feet of supporting columns. Other entrances are via pipe casings and through the bilges. When the concrete that closes off the bilge from the hold in the spaces between the ribs is broken, rats may enter by that route.

It is usually not necessary for the infestation inspector to search for runways in the holds, though the rat-proofing inspector must locate them. In the holds, runways are hard to find unless the walls and decks are of a light color, a most unusual condition in any but refrigerated compartments. Occasionally, however, they may be seen on wooden bulkheads, along beams passing through bulkheads, or along ribs passing through the 'tween deck.

On the 'tween or shelter deck, the fresh-water tanks should be located and the space above and below carefully inspected for rat runs and droppings. It is not uncommon for the space under such tanks to be the principal harborage on the ship. In the same way, any small inclosed space in a hold (most often found on the shelter or 'tween deck) should receive more than casual attention.

The insulation of cold-storage compartments may afford harborage to rats infesting other parts of the hold, or to rats infesting the compartment itself or to both. In the former case the entrance will be through openings in the outer covering of the insulation, most often where a beam passes through it, or at a corner.

Another favored harborage is an insulated pipe casing, where pipes pass through an uninsulated hold to a cold compartment. Such casings are usually easily distinguishable by their size and location. They

will often repay close scrutiny. When these casings are overhead, which is common, rats most often gain access at the corners where the wooden sheathing is fitted between beams.

Other signs in holds.—It is worth while inspecting the dust on the upper surfaces of the battens for rat tracks. Their total absence is strong evidence of the absence of rats, and their numbers, when present, often constitute a guide to the extent of the infestation. When cargo presents an extensive impressionable surface, the presence or absence of rat tracks thereon is equally as reliable evidence as the presence or absence of droppings on cargo.

Cold-storage holds.—Inside cold-storage compartments rat droppings are usually the first signs noted, though sometimes cuttings of the stored foods are first seen. Droppings are searched for on the gratings over the floor, along the battens, on the stores or cargo present, and, in holds or compartments designed for cold-air ventilation, in the air shafts. They may also be found under the gratings, though often difficult to see in this location. Next in order are rat holes leading into the insulation, usually found at or near the corners, either top or bottom, or alongside the refrigerant pipes where these pass through the sheathing. Runways are often present but do not stand out against the usual neutral background of varnished woodwork.

The walls of cold-storage compartments are more or less obscured by the refrigerant pipes and the closely set battens in front of them, which give the rat an opportunity to display its secretive skill in hiding its burrows and runways. Some of the most experienced inspectors have been forced to report the presence of rats in cold rooms, without being able to find their harborage, and the writer will never forget seeing a large rat run swiftly up a pipe and disappear into the insulation, through a hole that he had missed on four previous inspections.

Boatswain's store hold.—Just aft of the after hatch there is found on some ships a small hatch opening directly into a boatswain's storeroom, partitioned off from the 'tween deck (or shelter deck) of the after hold. This may or may not open into the poop. Rats often invade this space but seldom harbor in it. Droppings constitute the usual sign of infestation.

Bunkers.—In the bunkers, rat droppings and rat runways are not obvious. A dropping in coal dust may be, and usually is, most inconspicuous. Runways not only fail to show against the black background, but they are rapidly covered up by coal dust. In consequence, in empty or partly filled bunkers the inspector looks for another sign and omits full bunkers from inspection. On the floor of an empty coal bunker the rat must leave its track. Rat tracks may occur on any surface in a coal bunker, and, strange to say, are quite

as frequently found well out in the middle as along the sides. To see them, illumination must be from the side.

Poop.—In the poop the inspector will, in nearly all cases, find either the crew's quarters or a storeroom. In many instances there will be the crew's quarters and a storeroom, in which case the latter is often on a deck below, in space that, in other ships, is occupied by tanks. This may be entered through the crew's quarters, through the steering gear house, or through a separate hatch opening on deck. The after peak may be part of the poop or may be separate and entered through a hatch from the deck.

Crew's quarters in the poop are more likely to be rat infested than when located in the bow. Nearly always there is sheathing over the steel sides of the ship, usually accessible to rats. It is not uncommon to find a provision storeroom next to the quarters, this being the rule when oriental crews are carried. Rat infestation is generally detected by noting runways. Droppings may be found under bunks or seats, and in or on top of lockers. Rat holes, as usual, are in the most out-of-the-way places. It is common to find a casing for the telegraph leading to the steering engine or to a stern telegraph. This should always be looked for.

Storerooms in the poop are frequently cut up by partitions. Some of the compartments may have raised flooring or sheathing over the sides of the ship, or sheathing under the weather deck. When food stores are present, there frequently exists harborage and food in the same locality. Boatswain's stores are commonly located here, and often form extensive rat homes. The signs of infestation here are, primarily, droppings and runways. Because the distances traveled are short and the routes limited, runways are likely to be well marked. If infestation is heavy, they may be obvious. Generally they can be readily traced to harborages. As usual, they are mostly overhead or around the sides. Droppings are likely to be pretty well scattered, though in greater amount along the sides, on top of lockers, along runways, and among the stores. Rat cuttings or gnawings should be looked for. Rat nests may be found among the boatswain's stores, particularly in the coils of stored hawsers.

Officers' quarters.—In the engineers' and officers' quarters rat signs are quite rare. When present, there are nearly always droppings in out-of-the-way corners, under seats, behind the drawers, and in similar seldom-disturbed places. When droppings or other signs are found, the inspector should always look for a rat hole into the space behind the sheathing or through a partition. Runways may occasionally be observed.

Provision storeroom.—The provision storeroom may be below the bridge superstructure, usually opening through a hatch into the pantry above, or it may adjoin the pantry. Occasionally it is below the

galley or in the poop. As a rule, when in locations other than the poop it is not rat infested; but it may be heavily infested. When rats are present, droppings will invariably be found on the shelves, particularly the upper ones.

An ice box or cold-storage room may be in the poop, below the galley, adjoining the provision storeroom, or built on the deck. Infestation inside is unusual, but utilization of the insulation for harborage is only too common.

A potato locker is usually located on the deck. It may harbor rats or may be the feeding ground for rats living in the lifeboats. Cut potatoes are the most usual and prominent sign of infestation.

Lifeboats.—Lifeboats are easily inspected. Nearly always rats enter and leave them through the openings at either end of the covers, where the tackle passes through. In all life boats there is a small deck at the bow and at the stern, on which, if the boat is infested or frequently visited by rats, will be found droppings. A greasy mark around the edge of an opening in the cover and a rat-run along part of the tackle can often be demonstrated. The boxes holding the coiled rope of the hoisting tackle should not be overlooked. On tankers, the lifeboats should always be suspected.

INSPECTION OF TANKERS

Inspection on tankers is greatly simplified by reason of the elimination of holds. Rat life can not exist in the tanks, so that available spaces are the forepeak and forward hold, the bridge superstructure, the poop, the engine and fire rooms, and the lifeboats. The forepeaks and forward holds on tankers are alone rat infested with extreme rarity. They are too widely separated from a food supply. Their inspection, in the absence of rat signs elsewhere, may be cursory.

On tankers, the route of inspection is reversed, the inspector beginning aft and proceeding forward. In the stern he inspects the crew's quarters, mess rooms, galley, storerooms, and cold storage spaces. If rat life is indicated here, he then takes in the engine room and fireroom. Returning to the deck, he inspects the after lifeboats. Going next to the bridge superstructure, he takes in the officers' quarters, pantry, provision storeroom (if located here), and forward lifeboats. The forepeak and forehold (a small hold in the bow) are last. On a few tankers the crew's quarters are forward, in which case the forward end of the ship assumes more importance.

Many inspectors on tankers go first to the provision storeroom. The logic of this is obvious; as the cargo is inedible, any rats present must go to the storeroom for food. Occasionally, in the absence of rat signs in the storeroom, rats living in the lifeboats will be found feeding at the potato locker.

In all locations on tankers the inspector searches primarily for droppings, runways, and harborages. On the great majority of tankers, rat harborages are practically nonexistent. It is only when they are present that infestation is at all likely, which explains the special search for them. Special attention is given to the lifeboats, these being among the few possible harborage locations. If signs of infestation are found, it becomes important that the inhabited harborages be located both as a guide to the fumigators and because they can generally be eliminated at small expense.

INSPECTION OF PASSENGER VESSELS

Inspection of passenger vessels increases in difficulty practically in direct proportion to the square of the tonnage. Ships carrying but few passengers usually offer little more to inspect than cargo vessels, the passenger accommodations being only a few additional rooms in the officers' quarters. Large transatlantic liners, the other extreme, present a maze of decks, passages, galleys, mess rooms, saloons, varied types of passenger accommodations, holds, and a dozen other varieties of compartments that may require days of careful search to discover and properly inspect. A thoroughly competent inspection of a large liner requires a high degree of skill. If the inspection is for rat proofing, a minute knowledge of its construction must be secured first.

The usual route of infestation inspection is to begin on the highest level of the passenger accommodations and proceed down, taking each deck (more or less within the confines of that portion of the ship) in turn. Following this, the inspector proceeds forward and takes in the entire forward portion of the ship in the same manner, and then goes aft. However, such a routine must be subjected to considerable alteration on many ships, and, in the end, the inspector is likely to find himself going up and down, at one point and another, in order to follow the vagaries of marine architecture, as well as in accordance with the uses for which various parts of the ship may be modified.

Contrary to conditions on cargo vessels, the inspector is likely to find passenger and crew accommodations quite as badly or worse infested than the holds. This is due both to the presence of extensive harborage and to the presence of permanently maintained large stores of provisions. However, while rats may be in any part of the ship, they are more usual below the level of the main weather deck and in the working parts of the ship (except the engine room) than in passenger cabins, saloons, lounges, etc. They are much more easily detected in these locations, a fact that causes many inspectors to go first to galleys, storerooms, holds, and crew's quarters before inspecting compartments immediately inhabited by the passengers.

In first-class passenger accommodations, the surroundings are cleaned at short intervals, resulting in the removal of droppings and obliteration of runway markings.

Inspection in the forepeak, boatswain's storerooms, holds, and such locations does not materially differ from inspection of similar places on cargo vessels; but inspection in crew's quarters, galleys, storerooms, and in all places visited by passengers is mostly a search for runways and for places inaccessible to ordinary cleaning procedures, wherein droppings may be found. The discovery of these out-of-the-way spaces may severely test the detective abilities of the inspector, while the rat signs sometimes found in them may amaze the ship's officers, who frequently have no adequate conception of the locations visited by rats, or of their numbers. Locker rooms, small storerooms, small spaces housing ventilation motors, dumbwaiter housings, closed spaces, or lockers under stairways, and similar small compartments should be carefully searched out and inspected. It is in these that droppings and runways are least likely to have been disturbed.

Special mention must be made of the galleys. On the larger passenger vessels, it is almost universal practice to insulate the deckhead over the galley. This is done by packing the space (8 to 12 inches deep) between the sheathing and the deck above with some insulating material. Numerous openings large enough for rats to enter, unless the ship has been rat proofed, are provided at the corners, around beams, and around pipes, for their exclusive use. Such insulation has been found to accommodate as many as 200 rats.

The multiplicity of harborages and runway possibilities on the larger passenger vessels is likely to confuse the student inspector, who is often led astray in two directions: He may put too much time in searching for rats in unusual spots, and he may pass over unsuspected harborages because the surface fails to indicate their presence. In regard to the former, the inspector should constantly bear in mind that the old reliable standbys, the pipe casings and telegraph casings, are still among the preferred residence districts among rats on passenger vessels, while, as to the latter, he should be particularly alert to spot runways and should follow them with more care than on a cargo vessel, since they will often lead him to harborages into which he would never have thought of prying.

EXACT VERSUS GENERALIZED ESTIMATIONS OF INFESTATION

While it is true that many inspectors will consistently estimate, within a quite small margin of error, the precise numbers of rats on a ship, it is doubtful whether such precise estimates are of more value than those expressed in more generalized terms, always excepting the distinction between no rats and some rats. This is because

some of the various factors affecting estimates are too variable and indeterminate to permit of exact mathematical expression. For example, with all visible signs pointing to the presence of but two rats, such an estimate may, through the existence, concealed in a nest, of a recently born litter of, say, eight young rats, be 500 per cent in error. The mathematical error in such an instance, and in nearly all similar cases, is far more imposing than is the practical error, for the eight new-born rats are of very little immediate sanitary significance. An estimate of few rats, or of a single family, however, would have carried the same quarantine significance without being subject to too narrow numerical application. There is also a factor aside from those directly pointing to the number of rats actually present. This is the ability developed by the inspectors to judge the capabilities of the fumigation crews and the consequent tendency to modify their estimates in accordance with the number of rats they expect will be recovered by them, rather than make apparent overestimates, which they fear fumigation will not confirm. A distinct, apparently normal, tendency to underestimate, in cases of heavy infestation, has been noted.

It is indubitably true, however, that the greatest absolute numerical errors are made under the least important conditions; that is, when rats are numerous. This apparently paradoxical condition, since the more rats, the greater the quarantine menace, follows from the practically universal adoption at quarantine stations of a low level at which to draw the fumigation line, so that when rats are numerous on a ship, even a considerable error in the estimate of their actual numbers still puts them at a figure above that which determines fumigation. When rats are few, the estimates as to their numbers are more reliable and are made with much more confidence and with disregard of fumigation results. Where an inspector may hesitate to estimate 50 rats, when he believes the fumigators will recover only 20, any thought that they may get none when he estimates 5 fails to trouble him, since it can be met with a shrug and the obvious observation that only rats make rat droppings. The error is too plainly attached to the fumigators in such cases.

Of course, it is obviously easier to estimate exact numbers from a limited amount of rat signs than from a great many. A few examples will make this quite clear. A single set of rat tracks in the dust on a batten is positive evidence that one rat passed that way; similarly, a number of separate distinct tracks on the floor of a coal bunker could hardly have been the work of a multitude. On the other hand, a hodgepodge of tracks merely means many rats; it gives no real clue as to their precise numbers; the marks may equally well have been made by ten rats passing back and forth a hundred times, or by a hundred rats. Runways are the same; a faintly marked runway certainly has not been the route of travel for many rats—the inspector

can safely say not over four or five; but a heavily marked runway may have been made by 50 rats or 500. Sometimes as few as 10 or 12 rats, over a considerable period of time, may produce a very heavily marked runway indeed. The status of droppings is quite similar. A half dozen droppings in hold No. 2, and a half dozen more in the poop are almost certainly due to just two rats, one in each location, but the discovery of several hundred droppings scattered all over the ship gives no real basis for an exact estimate of numbers. Even a determination of the proportion of fresh droppings fails as a guide, unless definite information is at hand as to how long the infestation has existed. Furthermore, the inspector has not the time to be squeezing hundreds of droppings to see how many are fresh, while he might easily accomplish this in the case of a dozen or so.

One would judge from this that the most accurate estimate would be no rats. Experience has substantiated this view. The reason is quite plain: There is a sharp distinction between the absence and presence of fresh signs; there is no such sharp line between the signs of 5 rats and 10 rats, or between those produced by 20 rats and by 50 rats.

In view of the foregoing it should appear that, if instead of an exact estimate of the number of rats, it is a question of determining simply between four conditions, viz, absence of rats, slight (unimportant) infestation, moderate infestation (justifying eradicative measures), and heavy infestation, the report of a competent inspector would be more reliable. He should not make an appreciable error in one case in a hundred. Reports on this basis are in more accurate accord with the limitations of the evidence, but still furnish the basic information that is required, that is, whether the rat infestation is negligible or of sufficient proportions to justify fumigation or other eradicative measures. It also obviates any necessity to draw lines of prodecure at hard and fast numerical points; factors such as distribution of the rats, relative danger of presence of infection, etc., may be given their proper weight without being arbitrarily pushed aside by an estimate of one or two rats above the line.

On the other hand, there is no question that a precise numerical estimate presents a clearer picture to others than do generalized statements. This is true even when the estimate is between limiting figures, such as 5 to 10 rats, or 20 to 30 rats. Usually, when a generalized statement is made, the hearers reduce it mentally to figures, these differing with the individuals. Moderate infestation may mean about 15 rats to one, 25 to another, and 40 or 50 to a third.

It is obvious that this question has two sides. At the New York quarantine station it is met by requiring inspectors to make generalized reports to boarding officers, but to submit precise numerical estimates to the fumigation division.

TECHNIQUE OF ESTIMATING EXTENT OF INFESTATION

Accuracy of estimation necessarily depends on skill. This of course, can finally be acquired only through experience and practice. There are, however, certain general principles and details of technique that all inspectors observe, which will be herein set forth.

No rats.—Absence of infestation is not necessarily based on absence of signs, but must be based on the absence of *fresh* signs. No competent inspector ever reports a ship rat free on inferential or circumstantial evidence. Such a report is always primarily based on the absence of fresh signs. Principally this is an absence of fresh droppings. Even in the presence of numerous runways and much old droppings, an experienced inspector is often able definitely to determine that there are no live rats aboard, largely basing this on the absence of fresh droppings in places where at least a few should be, if live rats were on the ship. Of course a determination of the absence of droppings, when other signs indicate the past presence of rats, must be based on a painstakingly complete, as well as an expert, search. Also, it is of course true that the sight of live rats, the presence of bodies of rats which have recently died (except following fumigation), the presence of recent tracks, the presence of cuttings that can be definitely assigned to a recent date, will contradict even a total absence of droppings. As a matter of fact, however, such instances are so rare that they practically do not occur. In a rather wide experience, the writer has never seen a ship on which the presence of rats was established without fresh droppings being part of the evidence. While it is true that other signs may first call attention to the presence of rats, any reasonably complete search will reveal fresh droppings as well.

Old runways, old gnawings, harborages still showing signs of habitation, old nests, old rat carcasses, old droppings, even rat odor, may be present in the absence of rats. In such cases, infestation has existed but has been eliminated. It is largely because of this that droppings, which can readily be determined as fresh or old, have taken such a prominent place among the various rat signs as indicators of present infestation. When inspections and estimates of remaining infestation are required on ships that have recently been fumigated, dependence must be put almost wholly on the apparent age of droppings.

On loaded ships the total absence of rat droppings on the cargo has invariably been associated, in the writer's experience, with absence of rats in the holds.

Although droppings have been assigned a preeminent position in the determination of the absence of rat life, there are many ships on which the more or less obvious absence of other signs first produces on the inspector the impression of freedom from infestation. In fact, this may quickly become so plain to him that his search for droppings is greatly curtailed; if they are not found in the most likely places, he

does not look further. For example, the entire absence of harborage, or the presence of only a few small harborages that inspection reveals uninhabited, informs the inspector at once that rats are unlikely to be present and that if they are present their droppings must appear in the open. A rapid look along the borders and in the corners may be quite sufficient to confirm the first impression. In the superstructure a total absence of runways is rarely associated with the presence of rats and never with any great number of them.

The absence of rat tracks on impressionable surfaces is extremely good evidence of the absence of rats.

The statements of stevedores as to whether they have seen live rats during unloading is fairly good evidence as to their presence or absence. Nearly always when there is a material number of rats in the holds, they will be seen at one time or another by stevedores, who usually have little hesitancy in imparting the information.

Few rats.—Next we consider the determination of but few rats (unimportant infestation). Droppings again take first place, but a modified first place. First, they must not be numerous; this is obvious. Second, they must not be widespread. Third, it must be known that the ship has not had a recent cleaning sufficiently thorough to remove all or nearly all droppings. Fourth, the cargo carried must be considered, this being most important in the case of banana ships.

The first point being obvious, we proceed to the second. It should be readily recognized that even a quite limited number of droppings scattered all over the ship suggests numbers. For example, the presence of a few fresh droppings (they may not total more than twenty) in every one of five separate holds certainly indicates more than a few rats. The only widespread occurrence of a few droppings consistent with the presence of few rats is when they are found on a shelter deck covering three or more holds, in the practical absence of droppings on the lower levels. The occurrence of separated small collections of droppings in different parts of a ship, however, is not only consistent with few rats, but indicative of it. The finding of a few droppings in the forepeak and a few in No. 4 hold, with none in other parts of the ship, practically insures the presence of but one or two rats in each of these locations, and the absence of any general infestation.

In regard to the third point, it is regular practice to clean the holds after the cargo has been removed. While it is true that it is unusual to find this clean-up to include all the corners and out-of-the-way places, it does happen that some vessels are exceedingly well policed, and it also happens that sometimes a very thorough effort is made to remove all rat signs.

In setting down the fourth point, the writer was tempted to word it "Fourth, the vessel must not be a banana ship," because of the quite remarkable relative insignificance of droppings as an indication of the

extent of the infestation on these vessels. Partly this is due to the presence of large numbers of small, black ends from the bananas, which resemble rat droppings, and, hence, confuse and hide them, but is also partly due to the rats spending a large part of their time in the very extensive harborages, and to the relative absence of retired corners and shelves in the holds, these being closed in by the sheathing. Other cargoes may cause confusion; wheat and some other grains sometimes exhibit numerous black kernels that resemble small rat droppings, while some foodstuffs are infested by a small black insect that is astonishingly like a rat dropping in appearance. Ore dust sometimes covers up droppings or may make them appear old. Coal dust renders them almost indistinguishable.

The presence of extensive inhabited harborages, numerous runways, fresh cuttings, particularly cuttings of stores and cargo, nests not obviously old, recently dead rats, and particularly the sight of live rats, all largely contradict the evidence of but few droppings. As a rule, however, the signs check with each other, it being quite rare that other signs point to many rats while the number and location of fresh droppings suggest but few (exceptions, of course, occur in the case of recently fumigated vessels).

Tracks in coal dust and tracks in bulk cargo are sometimes extremely accurate indications of but few rats. When the surface susceptible to tracks is present, but the tracks are few, the number of rats can not be large. The writer, having made several estimates of a single rat, on the basis of a few, obviously single, trails over the surface of bulk linseed, has not as yet seen more than one recovered in these cases, although in one or two instances even the one could not be found. On some occasions inspectors have purposely obliterated all tracks over a given area and based an estimate of the rats present on the number of new tracks seen on the following day.

In the holds, tracks in dust constitute a reasonably accurate indicator when few in number; any large number of rats would make a large number of tracks. When numerous, the time element must modify the estimate, since, if the impressionable surface has been present over a considerable period, a large number of tracks may easily have been made by but few rats repeatedly passing over the same spots. The writer vividly recalls a fumigator estimating one large rat in a hold, ore laden, in which tracks all around the edges were quite numerous. He maintained that the tracks were mostly clear-cut, showing the toes, that they were all of one size, and that droppings, in addition to being all large, were very few in number. After fumigation, a very painstaking search disclosed just one large rat.

The evaluation of rat tracks as evidence is an intriguing study and one that will often repay close observation.

Variation in size of rat droppings is sometimes a clear indication of the approximate number of rats. The size of the droppings is largely governed by the size of the rats; consequently, when one finds a few large droppings and a somewhat greater number of a smaller size, the natural conclusion is that there is one rat family present, consisting of several small ones (three to nine are the usual limits) and at least one parent. The presence of small droppings only is rare. It indicates usually that the parents have emigrated to some other part of the ship.

The presence of only large droppings excludes young rats, except of a size still confined to the nest. This conclusion considerably reduces the likelihood of error in making low estimates, since, if one can exclude an indeterminate number of young rats, a large variant is eliminated. Of course it sometimes is a bit disconcerting to have an estimate of two rats, thoroughly accurate on the basis of signs noted, utterly spoiled by the fumigators' digging out a nest containing 11 infant rats—probably its location indicated by the body of a parent just outside the harborage.

In judging the number of rats from the droppings, the total of both old and fresh, as well as the degree of age, are important factors. For example, a large number of very old droppings and a few fresh ones, with few or none of an intermediate age, clearly indicate a heavy past infestation, that has been eliminated, and a recent light reinfestation. On the other hand, large numbers of droppings of varying age appearance, with types approximately leading up to the fresh, is rather suggestive of a relatively heavy infestation even though the actual fresh droppings are few. The history of eradicative procedures on the ship should be determined in such cases. A recent fumigation or extensive trapping, or even an effective poisoning, may adequately account for the conditions noted.

Many rats.—Coming now to the question of many rats, one finds the accuracy of a numerical estimate so greatly affected by indeterminate conditions that it is rarely that such estimates are better than approximations. Fortunately, the actual numbers are a matter of comparatively little moment. The important thing is to determine whether the rats are between zero and a few, or are more than a few. This can be done, and has been done, by numerous inspectors in routine work, with remarkable precision. As the number of rats increases, while it becomes much easier to state definitely that there are more than a few, it becomes increasingly difficult specifically to state just how many there are.

The difficulty arises from several sources, the most common being that when large numbers of rats are found, they have, as a rule, been present over a considerable period. If given time, a relatively small number of rats may give rise to a considerable quantity of rat signs.

On the other hand, experience has repeatedly shown that a relatively small amount of rat signs may sometimes be associated with a considerable number of rats. This latter condition is particularly true on ships where very extensive harborage exists, and is largely due to the rats remaining within the harborage except when foraging. On vessels with relatively cramped harborage, the rats roam the holds, creating better marked runways and leaving droppings in places where they can be seen. On fruit ships, harborage in the hold is often very extensive indeed. In addition, as already stated, the dried-up black tips of the bananas greatly resemble rat droppings and, being profusely scattered over the deck, render an accurate count of the latter quite difficult. Low estimates on such vessels should be made with caution. The writer has seen quite a number of 10- to 20- rat estimates on fruit ships proved too low by recoveries following fumigation of 40 or more. Wherever possible, the inspector should consult a fruit ship's past fumigation record before predicting the precise number of rats that it carries. Some other factors are variations in the number of droppings with different diets, concealed runways such as those inside a telegraph casing, removal of signs by the ship's crew, etc.

As a rule, heavy infestation (100 rats or more) is associated with rat signs in all holds, as well as in some of the other compartments. Exceptions to this rule, however, are numerous. When it is not true, its converse generally holds good, that is, that rats are exceptionally abundant in one compartment, or in one portion of the ship. Sometimes all the rats are in the forward portion of the ship; sometimes all are aft. Again, the great majority may be in a single compartment, as a provision storeroom, or in a cold-storage space. The heaviest infestation the writer ever saw was entirely confined to the poop, which included quarters for the oriental (Indian) crew, a provision storeroom, and an ice box, the insulation of the latter being the principal harborage. Every one of the six hundred and odd rats on the ship was in this location.

As has already been mentioned, the sight of live rats is strongly indicative of numbers, the usual rule being to multiply the number of live rats seen by 20 to get the probable total infestation. This rule, of course, is subject to modification and rather wide variation. It should be checked against other rat signs and the estimate reduced or increased as indicated. On some ships rats are so little molested that they appear at all times. While this indicates a considerable infestation, the rule of 20 for 1 must be reduced, sometimes to as low as 3 for 1. Live rats seen by stevedores during unloading operations can not be multiplied according to this rule, for the reasons that stevedores are in the holds over considerable periods of time, that moving pieces of cargo rout out rats hiding between or under them, and that the stevedores are naturally given to exaggeration. Their

statements as to the size of the rats seen are totally unreliable; they are very prone to employ the gross exaggeration "big as cats," usually accompanied by holding the hands some 3 feet apart to indicate the enormous length of the monsters.

Bodies of rats which have died recently, particularly partly eaten ones, suggest heavy infestation. When several are found, they too may be multiplied by 20 (provided other signs check) to arrive at the probable total. A single partly eaten carcass, however, does not mean a great deal, and one not eaten may even suggest a limited infestation, for rats are quite prone to eat the bodies of their dead fellows, even in the presence of abundant other food.

Distribution.—When rats are very numerous, the amount of rat signs constitutes the best guide to their numbers; when they are present in only moderate numbers, their location may be a better indication. This often holds true whether it is applied to a single compartment (provided it is relatively large, such as a hold) or to the whole ship. A very large number of droppings, including many fresh ones, indicates many rats. A relatively small number may indicate at least a moderate infestation if widely scattered, while confined to a single location they suggest but few rats. The same is true of runways, cuttings, and inhabited harborages. This applies particularly to the latter when they are limited, such as a few isolated casings. An inspector, finding in a hold a single inhabited casing with a collection of droppings near its entrance and another collection on a a shelf nearby, but not more than half a dozen or so elsewhere in the hold, would probably estimate two to four rats. If approximately the same number of droppings were scattered in all parts of the hold, certainly if they were on different levels his estimate would increase to six. The discovery of a second inhabited harborage would raise it to eight or more. On the other hand, should he find 200 or 300 fresh droppings and 4 or 5 inhabited harborages (or one extensive harborage), he would certainly figure 30 to 40 rats or more for that hold alone. Fifteen to twenty rats would be indicated by distinctly too many droppings for a few to produce, scattered in practically all parts of the hold, though usually more numerous on the level where the principal harborage is located.

When we consider the ship as a whole, distribution becomes distinctly more informative. It has already been mentioned that a very few droppings, in each of five holds, indicates at least a moderate infestation. Five rats, one for each hold, would be the absolute minimum estimate, but it would be so remarkable to see such an even distribution that no competent inspector would estimate less than 10, 2 for each hold. However, the same number of droppings confined to a shelter deck extending over the five holds, with no droppings in the lower levels, would constitute such a shrinkage of distribution as to justify reducing the estimate by half—to five rats.

The above illustration will suggest to the reader at once that the degree of isolation of the compartments in which the rat signs are found is important. Signs of infestation in all of five holds, separated from each other by rat-proof bulkheads, indicate more rats than in the same holds connected by an overlying shelter deck without bulkheads, or in the same holds with a runway, such as a telegraph casing, passing through them. The same holds true when rat signs are found in one or more holds and in a storeroom or crew's quarters. If the latter are quite distinct, more rats are indicated than when a telegraph casing connects them. Similarly, rat signs in the lifeboats and in a storeroom below decks strongly suggests separate colonies in both places, but, when in the lifeboats and in a potato locker on deck, obviously the same set of rats is involved.

The significance of distribution of signs is such as to cause most inspectors to figure their estimates by adding up the estimates for the various infested locations. For example, an estimate of 4 rats in the forepeak, 3 in No. 2 hold, 5 in the bunkers, 2 in No. 4 hold, and 8 in the poop would total 20 rats for the ship. The report would be moderate infestation of 20 to 30 rats.

Experience and skill.—Experience is a necessity in acquiring ability to estimate precise numbers of rats. It should be associated with competent fumigations to prevent the setting up of inaccurate standards. It is quite astonishing how closely the estimates of an expert inspector will check with the recoveries of a first-class fumigating crew. The writer has observed men whose estimates rarely varied more than 10 per cent from the recoveries, and, more astonishing, has seen them re-search ships on which recoveries fell below their estimates, and pull out, from obscure harborages, additional dead rats. One very remarkable instance confirmed an estimate of 35 rats, after a recovery of only 21, when the inspector went directly to a hidden (that is, missed by the fumigators) telegraph casing, broke it open, and pulled out exactly 14 rats; a most painstaking search thereafter failed to uncover a single additional rat.

As stated under the section on exact versus general estimations, generalized reports may be preferred to definite numerical estimates. Such a method of reporting will make for better statistical accuracy, since it permits wider margins. It is doubtful, however, whether it produces as high a degree of technical accuracy. An inspector required to report in general terms is likely to acquire the habit of observing, calculating, and finally inspecting, in general terms. On the other hand, inspection against mediocre fumigation is more likely to deteriorate under precise estimates than under approximate estimates, since the inspector, finding fumigation recoveries consistently below his figures, is naturally inclined to modify them, the modification becoming more specific when there appear precise figures for comparison.

Where general estimates are required, the administrative office should be careful not to turn them into precise estimates by assigning them hard and fast specific limits. For example, where the estimated presence of 5 rats is set as the line between slight and moderate infestation and 20 rats as that between moderate and heavy, then these figures automatically become precise estimates for the corresponding reports; that is, "few rats" means less than 5, "moderate infestation" between 5 and 20, and so on. It is true that it is much simpler to make determinations as to what procedures shall be instituted when definite figures are used, and they at least give the appearance of impartiality; but it will be readily appreciated that there is very little practical difference between the presence of 4 rats and 5 rats when it comes to determining whether a ship should be fumigated or not, and that there are so many other factors that affect its potential sanitary menace that it would appear that an arbitrary numerical dead-line was basically illogical and unjust.

The enumeration of some of these other factors will help to make this point clear. The ports of call are obviously of first importance, for one plague-infected rat means far more than a thousand not infected. Obviously, therefore, a greater degree of infestation is allowable in the case of ships from clean ports than in the case of those from plague-infected ports. Another factor is the length of the voyage. A relatively large rat colony is required to maintain infection on a voyage of a month or more, whereas one rat may carry it over four or five days. A third factor is the distribution on the ship. Twenty rats distributed evenly in five holds are far less likely to maintain an epizootic than the same 20 rats concentrated in one hold. In regard to the ship from reported clean ports, while even a large colony on board may not be of immediate menace, it constitutes a potential menace in that undiscovered infection may be present in a port of call, and in that on a future voyage the ship may visit infected ports. The practice of fumigating ships, regularly running to reported clean ports, only once in six months, therefore produces a contradictory factor; for, while the presence of 10 or 20 rats may have no immediate sanitary significance, if they are not destroyed they may, in six months, increase to 200 or 300 rats. It should be clear, then, that it is illogical that quarantine treatment should be determined solely on any arbitrary number of estimated rats, even though such a standard may be most convenient.

The quarantine treatment of a ship is determined by the administrative officer, not by the inspector. The administrative officer, however, accords to the inspector's report a position of major importance in arriving at a decision, modifying and correlating it with all other data concerning the vessel. Frequently the infestation status is

the determining factor, but not always by any means. Just what decision to make under various circumstances is outside the scope of this paper; but the modifying circumstances themselves are briefly considered in a following section.

DIFFERENTIATION BETWEEN SLIGHT AND MODERATE INFESTATION

A study of the various factors has shown that by far the most important point is the differentiation between slight and moderate rat infestation. In the majority of cases a report of moderate (or heavier) infestation will, *ipso facto*, become the basis for deciding on fumigation, while a report of slight (or no) infestation will become the permissive basis for waiving fumigation. Both the administrative officer and the inspector, therefore, must have in mind some figures limiting these conditions. It goes without saying that both should have the same standard. The dividing zone should be sufficiently elastic to be adaptable to modifying conditions. Its elasticity, however, and also its extent will depend largely on the competency of the inspector. With an expert inspector it can be put close to the actual lower limit of moderate infestation, but when dealing with one inexpert or untrained it must be safeguarded by placing it well within the actual fgures for slight infestation.

It is impossible to amplify the above remarks without going into specific figures. The reader is cautioned, however, that those mentioned in the following paragraph are mainly for illustrative purposes, to make clear the points involved, and that they are expressions of the personal opinion of the writer, specifically in respect to ships at continential United States ports. The limit of slight infestation should be sharply reduced for application at ports not far removed from infected ports, according to the time involved. In the Orient, for example, where the time, from port to port, is within a few days and plague infection is present in many of the ports, permissible rat infestation might well be reduced to zero.

In the writer's opinion (for ships at continental United States ports) 20 rats or more constitute a moderate infestation, 50 or more a heavy infestation. Less than 20 rats may or may not be regarded as a slight infestation, according as other factors apply, but less than 5 rats definitely constitutes slight infestation. Between 5 and 20 rats lies the dividing zone. Within its extent the treatment of individual ships should be determined on the basis of all the factors involved. If other factors are all unfavorable, the lowest limit, 5 rats, should apply; if all are favorable, the upper limit, 20 rats.

There are some exceptional circumstances that warrant raising the figure for permissible infestation. To use an extreme example, a ship operating exclusively between Eastport, Me., and Iceland might carry a very considerable rat colony without becoming a

quarantine menace worth considering. A more probable, but equally applicable, one would be a whaling vessel that had made no contact with shore for six months or more. The case of a ship from clean ports desiring to proceed to its home port for deratization may also come in this class.

FACTORS TO BE CONSIDERED

In this discussion, factors other than the actual numbers of rats have been repeatedly mentioned, some specifically referred to, others not. It will probably be well to cite briefly and discuss all of them in this section.

Ports of call.—Of prime importance are the ports of call. What these have been at once places a ship in either a suspect class or in one of relatively much less sanitary importance. Certain ports are of particular importance due to epidemic or epizootic conditions therein.

Time element.—A ship that has touched at an infected port and, thereafter, for two months only at clean ports is obviously far less likely to harbor infection than one 20 days out from the last infected port, and this, again, is of lesser menace than one 8 days out from such a port.

Fumigation and inspection record.—When there is available a record of past fumigations and inspections of a ship, it is of great assistance in arriving at an estimate of the present infestation. Most ships hold fairly true to their record. When this is negative, one expects to find no rats, or at most only a few; when it shows a persistently moderate infestation or infestations varying between slight and moderate, a moderate or slight infestation estimate may be expected; when large numbers of rats appear in the record, a heavy infestation estimate is looked for. Failure of the inspection estimate to check with the past record should invite attention and suggest a search of other factors for the cause. A record of persistently low infestation suggests unfavorable conditions on the ship and a slow increase of the rat colony; persistently heavy infestations suggest the opposite, probably including the existence of extensive deep harborage.

Interval between fumigations.—When a ship last fumigated two months previously shows evidence of many rats, it is a sign of a rapidly growing colony, a sudden heavy reinfestation from shore, or an ineffective fumigation. On the other hand, when few signs are found on one fumigated six months prior to inspection, it is proper to assume that the colony is growing very slowly. Consistently positive fumigations on a ship fumigated at short intervals, two to three months, constitute positive evidence of a persistent colony protected by deep harborage.

Rat-proofing status.—On a completely rat-proof ship it is difficult for a colony of any material proportions to exist. On one on which

the more extensive harborages have been eliminated, the colony will nearly always be much reduced. It is entirely logical, therefore, to place more reliance on a low inspection estimate when the ship is wholly or even partially rat-proof. Furthermore, a colony is far less likely to increase rapidly on a rat-proof ship. There are two types of exceptions: One is the case of ships regularly in the grain trade from exceptionally rat-infested ports; the other is the unusual case of a ship taking aboard a large number of rats in one lot of cargo.

Trade route and cargoes.—The effect of trade routes and cargoes is extensively discussed in another paper by the present writer. It is sufficient to state here that on some routes rat infestation is quite unusual, and, generally, when it occurs, is of slight extent.

Rat distribution on the ship.—It has already been noted that a moderate infestation, confined to one compartment, is of greater sanitary significance than the same number of rats distributed throughout the ship.

Harborage.—Ships exhibiting extensive rat harborage are naturally suspected of heavy infestation. The presence of such harborage also inspires the belief that, under the shelter of its protection, a small nucleus of rats, if not at once eliminated, may soon grow to a large colony.

Presence of cargo.—Fumigation on a loaded vessel is not as effective as fumigation of one when empty. This brings in an important factor; for, on ships from clean ports, fumigated only at intervals, fumigation should be carried out when empty. Such a ship when carrying cargo for two or more ports may properly be remanded to the port where it will be empty. On the other hand, a ship from an infected location may subject the port of arrival to a greater danger of infection, if permitted to unload before fumigation, than if fumigated loaded before going to dock. If rats are few, however, it may be better policy to take the risk in order to secure greater effectiveness of fumigation.

Length of stay in port.—Obviously, a ship that will remain only during the daylight hours of one day may be permitted a decidedly greater rat infestation than one which will remain two weeks.

Location in port.—A ship in the stream is very much less dangerous than one at a dock; one at an oil dock is less dangerous than one at a general merchandise pier, and this in turn is less dangerous than one at a grain elevator; one at a rat-proof dock is less likely to infect the port than one at a rat-infested dock.

Projected quarantine treatment.—The treatment under consideration must enter as a modifying factor. When it is a question of remand, the infestation status should be largely determinative in the case of ships from infected ports; such infested ships should be refused the remand privilege. On ships periodically fumigated, it may be better

to remand, even those heavily infested, to secure the greater effectiveness of fumigation when empty. Waiving fumigation so as to permit fumigation at a home port may be more appropriate in the face of a decidedly greater infestation than when fumigation is to be waived for six months. Successful trapping may serve in lieu of fumigation when the infestation is not too great.

DETERMINATION OF HARBORAGE

Harborage is a subject discussed at length in papers on rat proofing, by other writers, and will not be further taken up here. Of course, the well-trained inspector must be familiar with rat harborage, since it plays a most important part in his work. It is mentioned here, however, mainly to bring out that the inspector should note the location and type of harborages, since knowledge of this factor is required by the administrative officer as one factor in sizing up the situation.

REPORTS

Inspection reports should be written. They should include the following data:

1. Estimate of total infestation.
2. Location of infestation with approximate estimate for each compartment or unit.
3. Kind, amount, and location of evidence on which the estimate is based.
4. Kind, amount, and location of harborage, with notation as to what harborage is occupied by rats and which is the main harborage.
5. The amount and location of cargo.
6. Description of any factors affecting the accuracy of the inspection (sweeping up of droppings, painting out of runways, cargo sweepings simulating droppings, and similar factors).
7. Rat destructive or eradicative procedures preceding the inspection (fumigation, trapping, destruction of harborage, rat proofing, etc.).
8. Any factors that might interfere with eradicative procedures (cargo over bilges, hidden harborages, full bunkers, rats in deck harborages, etc.).
9. Any other data that may affect the quarantine status of the ship, or that may assist the fumigation crew or the rat-proofing inspectors.

RECORDS

Inspection reports should be recorded in the same manner as are fumigation records. They are of practically equal value. Both fumigation results and inspection reports should be recorded, as to

essentials, on readily accessible filing cards, alphabetically arranged according to names of ships.

DEATHS DURING WEEK ENDED MARCH 12, 1932

Summary of information received by telegraph from industrial insurance companies for the week ended March 12, 1932, and corresponding week of 1931. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended Mar. 12, 1932	Corresponding week, 1931
Policies in force	73,837,899	75,096,936
Number of death claims	15,338	16,248
Death claims per 1,000 policies in force, annual rate	10.9	11.3
Death claims per 1,000 policies, first 10 weeks of year, annual rate	10.1	11.3

Deaths [1] from all causes in certain large cities of the United States during the week ended March 12, 1932, infant mortality, annual death rate, and comparison with corresponding week of 1931. (From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Mar. 12, 1932				Corresponding week, 1931		Death rate [2] for the first 10 weeks	
	Total deaths	Death rate [2]	Deaths under 1 year	Infant mortality rate [3]	Death rate [2]	Deaths under 1 year	1932	1931
Total (83 cities)	9,364	13.4	648	[4] 54	13.8	855	12.4	14.2
Akron	46	9.1	5	62	10.3	7	8.0	8.6
Albany [5]	32	12.8	1	21	12.5	3	14.2	15.5
Atlanta [6]	70	12.9	6	58	20.7	20	14.2	16.8
White	37	10.3	2	29	15.6	7	11.2	13.8
Colored	33	18.0	4	115	30.8	13	20.2	22.8
Baltimore [5 6]	238	15.2	19	67	19.0	30	14.4	17.8
White	167	13.0	13	59	17.8	21	13.3	16.5
Colored	71	24.7	6	96	24.9	9	19.4	23.7
Birmingham [6]	66	12.5	9	94	15.9	6	12.5	15.0
White	33	10.0	4	66	13.8	4	10.4	11.5
Colored	33	16.4	5	135	19.3	2	15.8	20.6
Boston	257	17.0	22	66	14.5	19	15.3	17.0
Bridgeport	37	13.1	4	71	11.7	1	11.9	13.6
Buffalo	172	15.3	16	77	15.3	15	13.3	15.4
Cambridge	34	15.5	4	83	11.9	1	13.7	14.0
Camden	52	22.8	4	70	19.3	8	15.5	18.5
Canton	35	16.9	0	0	14.6	0	10.3	11.5
Chicago [5]	703	10.4	41	40	11.2	79	11.2	12.3
Cincinnati	142	16.1	8	51	16.2	4	16.2	18.3
Cleveland	231	13.1	12	39	14.0	19	11.3	12.6
Columbus	86	15.0	4	40	16.1	4	14.9	14.9
Dallas [6]	54	10.0	0	-------	12.8	7	11.6	12.5
White	47	10.5	4	-------	11.1	5	10.9	11.1
Colored	7	7.5	2	-------	20.9	2	15.0	19.1
Dayton	63	13.8	3	43	13.1	0	11.8	12.7
Denver	89	15.8	5	49	16.8	9	17.0	16.0
Des Moines	30	10.7	3	51	15.5	2	11.8	12.4
Detroit	370	11.2	38	68	9.6	41	8.7	9.9
Duluth	16	8.2	1	29	7.2	0	9.8	12.3
El Paso	32	15.6	0	-------	13.4	5	15.0	18.4
Erie	35	15.4	1	21	9.3	3	11.1	11.5
Fall River [5 7]	22	10.0	2	53	14.9	3	12.8	13.9
Flint	37	11.4	4	59	10.2	7	9.1	8.1
Fort Worth [6]	28	8.6	3	-------	14.3	5	10.5	11.6
White	24	8.7	3	-------	15.6	5	10.1	11.2
Colored	4	7.8	0	-------	7.7	0	12.5	13.8

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended March 12, 1932, infant mortality, annual death rate, and comparison with corresponding week of 1931—Continued

[The rates published in this summary are based upon mid-year population estimates derived from the 1930 census]

City	Week ended Mar. 12, 1932				Corresponding week, 1931		Death rate for the first 10 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1932	1931
Grand Rapids	35	10.5	1	17	12.5	1	9.1	10.0
Houston [5]	65	10.5	4	-------	11.6	7	11.0	12.2
White	49	10.7	2	-------	11.5	6	10.4	11.3
Colored	16	9.8	2	-------	11.9	1	12.7	14.6
Indianapolis [5]	106	14.8	8	65	15.8	5	14.0	15.5
White	88	14.0	7	64	14.5	5	13.4	15.0
Colored	18	20.4	1	69	25.4	0	18.1	19.4
Jersey City	87	14.2	6	50	14.5	16	11.4	14.3
Kansas City, Kans. [5]	32	13.5	1	22	16.5	7	13.3	17.1
White	28	14.6	1	27	13.6	5	13.1	15.4
Colored	4	8.8	0	0	28.8	2	14.3	24.2
Kansas City, Mo.	115	14.4	6	68	17.2	9	13.1	15.8
Knoxville [5]	33	15.4	4	101	20.1	2	11.9	14.9
White	29	16.2	4	112	21.7	2	11.2	13.9
Colored	4	11.4	0	0	11.7	0	15.1	20.2
Long Beach	26	8.4	0	0	9.2	2	10.8	10.2
Los Angeles	258	9.8	21	62	11.8	19	12.3	12.0
Louisville [5]	73	12.4	2	18	36.4	13	14.2	19.4
White	52	10.4	1	10	32.2	10	12.5	17.3
Colored	21	23.0	1	75	59.0	3	23.1	30.5
Lowell [7]	21	11.0	1	26	16.1	6	14.8	15.0
Lynn	25	12.7	1	28	13.7	2	11.8	12.9
Memphis [5]	74	14.7	7	76	24.6	11	16.9	17.9
White	41	13.2	4	68	20.2	4	12.8	15.4
Colored	33	17.1	3	90	31.6	7	23.4	21.9
Miami [5]	24	11.0	2	56	19.5	2	12.5	14.6
White	17	10.0	2	78	18.5	0	12.1	13.9
Colored	7	14.5	0	0	22.7	2	13.8	17.3
Milwaukee	129	11.2	4	19	11.2	17	9.7	11.0
Minneapolis	122	13.2	8	52	11.2	19	11.6	12.3
Nashville [5]	55	18.3	6	90	17.1	4	14.5	18.5
White	38	17.4	5	98	16.2	3	13.8	16.0
Colored	17	20.7	1	62	19.5	1	16.3	25.2
New Bedford [7]	24	11.1	1	29	9.3	2	13.1	13.3
New Haven	44	14.1	3	60	17.9	0	12.7	13.8
New Orleans [5]	159	17.5	10	57	17.5	14	15.6	19.6
White	99	15.4	4	35	15.0	6	13.1	16.1
Colored	60	22.8	6	98	23.6	8	21.8	28.1
New York	1,985	14.4	112	50	12.4	144	11.6	13.9
Bronx Borough	297	11.2	20	58	8.2	17	8.8	10.1
Brooklyn Borough	718	14.0	48	53	11.7	62	10.8	13.0
Manhattan Borough	704	20.7	34	49	19.1	46	17.6	21.1
Queens Borough	200	8.6	4	17	7.6	14	7.5	9.2
Richmond Borough	66	20.6	6	118	14.7	5	14.6	15.0
Newark, N. J.	121	14.1	12	66	13.9	13	11.6	14.2
Oakland	70	12.2	3	38	11.8	2	11.9	12.1
Oklahoma City	34	8.6	3	41	12.5	8	9.9	11.8
Omaha	57	13.6	3	34	10.8	2	15.4	14.5
Paterson	40	15.0	4	73	17.7	1	12.9	16.6
Peoria	32	15.0	3	83	13.9	2	12.8	14.9
Philadelphia	529	14.0	36	56	15.1	64	13.0	16.6
Pittsburgh	244	18.7	25	114	20.8	30	15.3	18.4
Portland, Oreg.	77	12.9	1	13	12.1	1	12.7	12.9
Providence	70	14.3	9	87	12.3	7	14.9	15.9
Richmond [5]	46	13.0	0	0	19.0	5	15.3	18.4
White	29	11.4	0	0	16.3	3	12.9	15.3
Colored	17	16.8	0	0	25.6	2	21.2	26.1
Rochester	103	16.1	9	86	14.6	9	12.3	14.2
St. Louis	226	14.2	10	36	16.2	18	14.1	18.8
St. Paul	60	11.2	3	32	13.4	3	11.1	11.3
Salt Lake City [5]	36	13.0	3	47	15.7	2	12.1	12.5
San Antonio	81	17.2	11	-------	14.6	7	15.2	15.4
San Diego	23	17.0	4	87	10.7	2	17.2	15.8
San Francisco	187	14.8	8	55	14.2	8	14.4	14.9
Schenectady	22	11.9	3	87	8.7	3	11.3	12.1
Seattle	98	13.6	3	30	15.4	3	12.6	13.1
Somerville	25	12.3	0	0	9.9	2	9.8	12.0

See footnotes at end of table.

Deaths from all causes in certain large cities of the United States during the week ended March 12, 1932, infant mortality, annual death rate, and comparison with corresponding week of 1931—Continued

City	Week ended Mar. 12, 1932				Corresponding week, 1931		Death rate for the first 10 weeks	
	Total deaths	Death rate	Deaths under 1 year	Infant mortality rate	Death rate	Deaths under 1 year	1932	1931
South Bend	18	8.5	1	29	5.8	0	8.4	9.1
Spokane	25	11.2	2	53	11.7	4	12.5	12.7
Springfield, Mass	36	12.2	3	51	17.1	7	11.8	14.7
Syracuse	52	12.6	6	77	9.1	4	11.9	13.0
Tacoma	17	8.2	0	0	18.4	7	12.0	15.3
Tampa [6]	26	12.6	3	86	15.4	2	12.3	15.7
White	20	12.3	1	35	12.6	0	12.0	14.0
Colored	6	13.8	2	317	25.8	2	13.5	21.8
Toledo	87	15.1	8	87	13.5	4	13.0	13.5
Trenton	55	23.2	5	99	18.5	3	15.6	19.7
Utica	26	13.2	3	85	15.3	2	15.6	16.7
Washington, D. C. [6]	172	18.2	11	62	16.4	10	16.7	18.8
White	112	16.4	5	41	14.8	4	15.1	16.3
Colored	60	22.9	6	107	20.5	6	20.8	25.3
Waterbury	16	8.2	0	0	13.4	5	9.7	11.4
Wilmington, Del. [7]	35	17.2	3	68	15.7	3	17.4	16.8
Worcester	59	15.5	3	42	11.6	3	13.1	15.3
Yonkers	22	8.1	0	0	6.8	1	7.5	10.7
Youngstown	38	11.3	9	146	13.0	8	10.6	12.0

[1] Deaths of nonresidents are included. Stillbirths are excluded.
[2] These rates represent annual rates per 1,000 population, as estimated for 1932 and 1931 by the arithmetical method.
[3] Deaths under 1 year of age per 1,000 estimated live births. Cities left blank are not in the registration area for births.
[4] Data for 78 cities.
[5] Deaths for week ended Friday.
[6] For the cities for which deaths are shown by color the percentages of colored population in 1930 were as follows: Atlanta, 33; Baltimore, 18; Birmingham, 38; Dallas, 17; Fort Worth, 16; Houston, 27; Indianapolis, 12; Kansas City, Kans., 19; Knoxville, 16; Louisville, 15; Memphis, 38; Miami, 23; Nashville, 28; New Orleans, 29; Richmond, 29; Tampa, 21; and Washington, D. C., 27.
[7] Population Apr. 1, 1930; decreased 1920 to 1930, no estimate made.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Reports for Weeks Ended March 19, 1932, and March 21, 1931

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended March 19, 1932, and March 21, 1931

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Mar. 19, 1932	Week ended Mar. 21, 1931	Week ended Mar. 19, 1932	Week ended Mar. 21, 1931	Week ended Mar. 19, 1932	Week ended Mar. 21, 1931	Week ended Mar. 19, 1932	Week ended Mar. 21, 1931
New England States:								
Maine	3	1	32	51	307	71	1	0
New Hampshire	2			2	6	23	0	0
Vermont	3	2			73	9	0	0
Massachusetts	42	52	9	9	479	500	3	1
Rhode Island	5	6		6	355	8	0	0
Connecticut	8	6	70	17	200	794	0	2
Middle Atlantic States:								
New York	110	124	[1] 244	[1] 47	2,251	1,901	13	18
New Jersey	22	52	205	51	224	687	1	5
Pennsylvania	104	101			2,029	3,503	3	8
East North Central States:								
Ohio	28	43	198	55	516	520	0	3
Indiana	39	25	294	34	65	654	10	7
Illinois	88	106	426	64	346	1,689	4	12
Michigan	43	42	110	79	942	147	6	14
Wisconsin	10	13	773	78	574	314	2	1
West North Central States:								
Minnesota	10	20	2	1	12	112	2	2
Iowa	9	4			4	20	0	2
Missouri	30	29	26	65	56	349	0	15
North Dakota	3				95	11	0	0
South Dakota	5	11	16		25	80	2	0
Nebraska	9	11	22	3	3	7	1	0
Kansas	27	24	3	34	240	24	1	0
South Atlantic States:								
Delaware		3		2	1	120	0	0
Maryland [2]	20	11	263	99	53	1,228	0	1
District of Columbia	11	11	2	5	3	223	0	5
Virginia							1	
West Virginia	14	14	378	95	626	58	0	1
North Carolina	15	17	52	118	571	698	3	5
South Carolina	8	17	1,477	1,088	84	127	0	1
Georgia	7	10	266	630	88	151	1	1
Florida	14	14	5	83	4	289	0	3
East South Central States:								
Kentucky	23		1,045		96	415	6	3
Tennessee	11	4	2,675	292	149	197	2	1
Alabama	9	13	66	402	1	543	1	18
Mississippi	12	12					1	2
West South Central States:								
Arkansas	8	7	282	285		35	1	2
Louisiana	23	19	22	34	56	38	3	5
Oklahoma [3]	12	19	791	140	12	24	1	1
Texas	30	17	460	133	27	71	1	1

[1] New York City only.
[2] Week ended Friday.
[3] Figures for 1932 are exclusive of Oklahoma City and Tulsa and for 1931 are exclusive of Tulsa only.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended March 19, 1932, and March 21, 1931—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Mar. 19, 1932	Week ended Mar. 21, 1931	Week ended Mar. 19, 1932	Week ended Mar. 21, 1931	Week ended Mar. 19, 1932	Week ended Mar. 21, 1931	Week ended Mar. 19, 1932	Week ended Mar. 21, 1931
Mountain States:								
Montana	----	3	105	----	95	8	0	0
Idaho	----	1	2	2	2	4	0	0
Wyoming	----	----	----	3	5	5	0	0
Colorado	12	5	----	----	82	166	1	2
New Mexico	18	4	690	6	53	96	0	2
Arizona	2	1	27	12	2	132	0	5
Utah [2]	1	1	----	15	1	2	0	2
Pacific States:								
Washington	----	5	----	1	623	40	1	1
Oregon	8	6	201	204	173	86	1	0
California	92	48	138	430	524	1,378	3	4
Total reported	969	934	11,377	4,675	12,133	17,548	76	156

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Mar. 19, 1932	Week ended Mar. 21, 1931	Week ended Mar. 19, 1932	Week ended Mar. 21, 1931	Week ended Mar. 19, 1932	Week ended Mar. 21, 1931	Week ended Mar. 19, 1932	Week ended Mar. 21, 1931
New England States:								
Maine	0	0	29	43	0	0	0	1
New Hampshire	0	0	41	1	0	0	0	0
Vermont	0	0	8	8	4	0	0	0
Massachusetts	0	0	504	409	0	0	3	3
Rhode Island	0	0	50	49	0	0	1	0
Connecticut	0	0	125	54	0	0	0	0
Middle Atlantic States:								
New York	2	0	1,741	923	6	1	4	5
New Jersey	0	0	288	313	0	0	2	2
Pennsylvania	0	2	1,050	555	0	0	13	9
East North Central States:								
Ohio	1	1	349	398	38	46	9	6
Indiana	0	5	166	340	11	119	6	1
Illinois	0	1	443	567	23	39	6	5
Michigan	1	0	446	439	13	20	14	10
Wisconsin	0	1	69	156	0	6	2	0
West North Central States:								
Minnesota	0	0	124	96	4	5	2	0
Iowa	0	1	64	120	39	80	2	1
Missouri	0	0	50	349	8	55	1	3
North Dakota	0	1	10	12	4	4	0	1
South Dakota	0	0	11	25	14	27	1	0
Nebraska	0	0	32	45	8	82	0	2
Kansas	0	3	48	99	4	106	0	0
South Atlantic States:								
Delaware	0	0	16	25	0	0	0	0
Maryland [2]	0	0	136	78	0	0	4	2
District of Columbia	0	0	29	32	0	0	0	1
Virginia	1	----	----	----	----	----	----	----
West Virginia	0	0	38	18	0	11	10	2
North Carolina	1	0	62	62	3	0	3	1
South Carolina	0	0	6	10	0	0	4	2
Georgia	0	1	10	110	1	0	12	15
Florida	0	0	5	5	0	0	5	1
East South Central States:								
Kentucky	0	0	117	58	4	14	16	1
Tennessee	1	0	29	37	19	16	7	4
Alabama	0	1	22	29	17	8	7	7
Mississippi	1	0	11	23	31	24	6	3
West South Central States:								
Arkansas	0	0	11	23	22	22	1	4
Louisiana	0	0	21	23	3	24	14	5
Oklahoma [3]	0	0	17	45	8	67	0	2
Texas	0	0	43	23	72	54	4	2

[2] Week ended Friday.
[3] Figures for 1932 are exclusive of Oklahoma City and Tulsa and for 1931 are exclusive of Tulsa only.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended March 19, 1932, and March 21, 1931—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Mar. 19, 1932	Week ended Mar. 21, 1931	Week ended Mar. 19, 1932	Week ended Mar. 21, 1931	Week ended Mar. 19, 1932	Week ended Mar. 21, 1931	Week ended Mar. 19, 1932	Week ended Mar. 21, 1931
Mountain States:								
Montana	1	0	38	20	2	6	0	2
Idaho	0	0	9	7	4	1	0	0
Wyoming	0	0	12	35	0	4	3	0
Colorado	0	0	37	59	0	3	0	0
New Mexico	0	1	11	12	0	4	1	2
Arizona	0	0	8	9	0	0	0	0
Utah [1]	0	0	7	16	0	1	1	0
Pacific States:								
Washington	0	0	29	51	13	57	1	2
Oregon	0	1	23	17	11	43	0	2
California	3	1	162	125	8	32	4	6
Total reported	12	20	6,566	5,923	394	990	169	115

[1] Week ended Friday.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
February, 1932										
Colorado	5	36	4		202		1	139	6	3
Indiana	30	237	400		408		3	541	76	14
Massachusetts	6	226	62	1	1,566		4	2,070	5	13
Michigan	7	193	276		1,803	1	4	1,939	11	30
New Jersey	13	185	280		576		5	1,062	0	8
North Dakota	2	20	43		257		1	93	34	2
Vermont					526		1	61	78	7

February, 1932

Anthrax:	Cases
Massachusetts	1
Chicken pox:	
Colorado	355
Indiana	542
Massachusetts	919
Michigan	1,412
New Jersey	1,409
North Dakota	88
Vermont	168
Dysentery:	
Massachusetts	1
German measles:	
Colorado	3
Massachusetts	62
New Jersey	48
Impetigo contagiosa:	
Colorado	2
Lead poisoning:	
New Jersey	4
Lethargic encephalitis:	
Massachusetts	1
Michigan	1
New Jersey	1
North Dakota	1

Mumps:	Cases
Colorado	251
Indiana	377
Massachusetts	1,168
Michigan	1,378
New Jersey	448
North Dakota	124
Vermont	267
Ophthalmia neonatorum:	
Massachusetts	112
New Jersey	2
Rabies:	
Indiana	1
Scabies:	
Colorado	1
Septic sore throat:	
Indiana	1
Massachusetts	14
Michigan	85
North Dakota	1
Tetanus:	
Massachusetts	1
New Jersey	1
Trachoma:	
Indiana	1

Trachoma—Continued.	Cases
Massachusetts	1
New Jersey	1
Tularemia:	
Michigan	3
Typhus fever:	
New Jersey	2
Undulant fever:	
Colorado	3
Michigan	5
New Jersey	3
Vermont	1

Vincent's angina:	Cases
Colorado	4
Indiana	2
Whooping cough:	
Colorado	87
Indiana	471
Massachusetts	853
Michigan	1,167
New Jersey	1,700
North Dakota	10
Vermont	169

RECIPROCAL NOTIFICATIONS

Notifications regarding communicable diseases sent during the month of February, 1932, by departments of health of States named to other State health departments

Disease	California	Illinois	Massachusetts	Minnesota	New York
Diphtheria			1		
Scarlet fever					1
Tuberculosis	15	8		16	
Typhoid fever	1			1	

ADMISSIONS TO HOSPITALS FOR THE INSANE, JUNE, 1930

Reports for the month of June, 1930, showing new admissions to hospitals for the care and treatment of the insane were received by the Public Health Service from 113 hospitals, located in 37 States, the District of Columbia, and the Territory of Hawaii. The 113 hospitals had 178,529 patients on June 30, 1930, 95,544 males and 82,985 females, the ratio being 115 males per 100 females.

The following table gives the number of new admissions for the month of June, 1930, by psychoses:

Phychoses	Male	Female	Total
1. Traumatic psychoses	17	3	20
2. Senile psychoses	163	149	312
3. Psychoses with cerebral arteriosclerosis	195	113	308
4. General paralysis	238	67	305
5. Psychoses with cerebral syphilis	30	11	41
6. Psychoses with Huntington's chorea	0	6	6
7. Psychoses with brain tumor	0	1	1
8. Psychoses with other brain or nervous disease	34	14	48
9. Alcohol psychoses	138	12	150
10. Psychoses due to drugs and other exogenous toxins	9	8	17
11. Psychoses with pellagra	13	27	40
12. Psychoses with other somatic diseases	34	45	79
13. Manic-depressive psychoses	219	256	475
14. Involution melancholia	15	39	54
15. Dementia praecox (schizophrenia)	404	313	717
16. Paranoia and paranoid conditions	35	47	82
17. Epileptic psychoses	63	31	94
18. Psychoneuroses and neuroses	18	50	68
19. Pyschoses with psychopathic personality	19	11	30
20. Psychoses with mental deficiency	59	39	98
21. Undiagnosed psychoses	172	97	269
22. Without psychosis	184	65	249
Total	2,059	1,404	3,463

During the month of June, 1930, there were 3,463 new admissions to the hospitals, 59.5 per cent of these new admissions being males and 40.5 per cent females, the ratio being 147 males per 100 females. Five hundred and eighteen of the new admissions were reported as being undiagnosed or "without psychosis." There were 2,945 new admissions for whom provisional diagnoses were made. Of these 2,945 patients, cases of dementia præcox constituted 24.3 per cent; manic-depressive psychoses, 16.1 per cent; senile psychoses, 10.6 per cent; psychoses with cerebral arteriosclerosis, 10.5 per cent; and general paralysis, 10.4 per cent. These five classes accounted for 71.9 per cent of the new admissions for whom diagnoses were made.

The following table shows the number of patients in the hospitals and on parole on June 30, 1930:

	Male	Female	Total
Patients on books last day of month:			
In hospitals	86,116	75,793	161,909
On parole or otherwise absent, but still on books	9,428	7,192	16,620
Total	95,544	82,985	178,529

Of the 178,529 patients, 9,428 males and 7,192 females were on parole or otherwise absent but still on the books at the end of the month—9.9 per cent of the males, 8.7 per cent of the females, and 9.3 per cent of the total number of patients.

GENERAL CURRENT SUMMARY AND WEEKLY REPORTS FROM CITIES

The 97 cities reporting cases used in the following table are situated in all parts of the country and have an estimated aggregate population of more than 34,019,000. The estimated population of the 91 cities reporting deaths is more than 32,490,000. The estimated expectancy is based on the experience of the last nine years, excluding epidemics.

Weeks ended March 12, 1932, and March 14, 1931

	1932	1931	Estimated expectancy
Cases reported			
Diphtheria:			
46 States	1,041	998	----
97 cities	383	418	778
Measles:			
45 States	13,085	17,665	----
97 cities	4,370	6,076	----
Meningococcus meningitis:			
46 States	77	189	----
97 cities	41	79	----
Poliomyelitis: 46 States	17	19	----
Scarlet fever:			
46 States	6,438	6,229	----
97 cities	3,134	2,405	1,624
Smallpox:			
46 States	290	894	----
97 cities	32	125	56
Typhoid fever:			
46 States	176	97	----
97 cities	30	21	23
Deaths reported			
Influenza and pneumonia: 91 cities	1,429	1,378	----
Smallpox:			
91 cities	1	0	----
Chicago, Ill.	1	0	----

City reports for week ended March 12, 1932

The "estimated expectancy" given for diphtheria, poliomyelitis, scarlet fever, smallpox, and typhoid fever is the result of an attempt to ascertain from previous occurrence the number of cases of the disease under consideration that may be expected to occur during a certain week in the absence of epidemics. It is based on reports to the Public Health Service during the past nine years. It is in most instances the median number of cases reported in the corresponding weeks of the preceding years. When the reports include several epidemics, or when for other reasons the median is unsatisfactory, the epidemic periods are excluded, and the estimated expectancy is the mean number of cases reported for the week during non epidemic years.

If the reports have not been received for the full nine years, data are used for as many years as possible, but no year earlier than 1923 is included. In obtaining the estimated expectancy, the figures are smoothed when necessary to avoid abrupt deviation from the usual trend. For some of the diseases given in the table the available data were not sufficient to make it practicable to compute the estimated expectancy.

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
NEW ENGLAND								
Maine:								
Portland	2	1	1	1	0	110	0	5
New Hampshire:								
Concord	0	0	0	----------	0	3	0	2
Manchester	0	0	0	----------	2	0	0	0
Nashua	0	0	0	----------	0	0	0	0
Vermont:								
Barre	0	0	0	----------	0	0	1	1
Burlington	0	0	0	----------	0	4	2	0
Massachusetts:								
Boston	56	25	19	----------	2	16	46	25
Fall River	10	3	1	----------	0	29	1	1
Springfield	23	3	0	----------	0	12	22	2
Worcester	6	2	1	1	0	1	34	8
Rhode Island:								
Pawtucket	0	1	0	----------	0	0	0	0
Providence	6	7	0	----------	1	198	6	15
Connecticut:								
Bridgeport	2	5	0	3	3	2	0	7
Hartford	15	4	0	----------	2	5	11	13
New Haven	20	1	0	7	0	0	12	2
MIDDLE ATLANTIC								
New York:								
Buffalo	34	11	4	----------	2	15	12	29
New York	220	196	102	324	75	149	158	375
Rochester	8	5	1	----------	0	562	10	6
Syracuse	27	3	0	----------	0	453	11	4
New Jersey:								
Camden	16	4	3	1	0	1	6	3
Newark	54	14	2	34	0	11	59	19
Trenton	10	2	0	8	2	0	8	10
Pennsylvania:								
Philadelphia	199	60	9	13	12	18	64	57
Pittsburgh	25	17	4	11	16	245	64	58
Reading	42	2	1	----------	0	3	0	4
Scranton	3	----------	1	----------	----------	1	1	----------
EAST NORTH CENTRAL								
Ohio:								
Cincinnati	2	7	8	2	9	0	0	17
Cleveland	95	26	7	185	7	697	113	35
Columbus	7	1	5	5	5	0	3	5
Toledo	15	5	3	8	7	42	0	9
Indiana:								
Fort Wayne	3	3	10	----------	1	0	0	0
Indianapolis	39	5	1	----------	3	10	78	17
South Bend	2	2	0	----------	1	1	0	0
Terre Haute	1	0	0	----------	0	0	0	1
Illinois:								
Chicago	121	89	31	16	16	202	5	64
Springfield	1	0	0	2	1	1	13	1

City reports for week ended March 12, 1932—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST NORTH CENTRAL—continued								
Michigan:								
Detroit	70	45	28	56	15	98	24	47
Flint	18	2	0	74	0	91	82	7
Grand Rapids	6	1	0		4	131	17	5
Wisconsin:								
Kenosha	1	0	0	3	0	2	0	2
Madison	10	1	2			4	1	
Milwaukee	88	14	1	4	4	294	21	18
Racine	16	3	0		0	45	88	1
Superior	12	0	0		0	0	12	0
WEST NORTH CENTRAL								
Minnesota:								
Duluth	5	0	0		2	0	0	3
Minneapolis	20	12	7		1	4	19	14
St. Paul	4	5	0	2	2	1	16	6
Iowa:								
Davenport	2	0	0			0	0	
Des Moines	0	1	2			0	0	
Sioux City	2	1	0			1	0	
Waterloo	4	0	0			0	1	
Missouri:								
Kansas City	16	6	6		0	3	0	16
St. Joseph	5	1	5		0	0	0	6
St. Louis	46	37	10	3		2	7	13
North Dakota:								
Fargo	1	0	0		0	14	0	1
South Dakota:								
Aberdeen	0	0	0			14	0	
Nebraska:								
Omaha	4	4	8		0	1	6	8
Kansas:								
Topeka	22	1	1	3	0	0	6	1
Wichita	11	1	2		0	61	0	6
SOUTH ATLANTIC								
Delaware:								
Wilmington	1	2	0		0	0	0	6
Maryland:								
Baltimore	121	19	11	119	8	1	141	35
Cumberland	0	1	0	6	0	4	0	3
Frederick	0	0	1		0	1	0	2
District of Columbia:								
Washington	46	13	8	14	6	1	0	21
Virginia:								
Lynchburg	5	2	0		0	0	0	1
Norfolk	0	1	1		0	1	0	6
Richmond	9	3	1		1	0	0	7
Roanoke	6	1	1		0	0	0	3
West Virginia:								
Charleston	7	0	0	11	0	95	0	5
Huntington	3		0			3	0	
Wheeling	0	1	0		3	1	0	6
North Carolina:								
Raleigh	5	0	0		0	38	0	2
Wilmington	1	0	0		0	0	0	3
Winston-Salem	11	1	1		0	1	5	4
South Carolina:								
Charleston	5	0	1	70	0	0	0	2
Columbia	2	0	0		0	1	0	1
Greenville	0	0	0			0	0	
Georgia:								
Atlanta	4	3	1	15	1	3	0	11
Brunswick	3	0	0		1	0	0	0
Savannah	3	0	2	4	0	0	0	2
Florida:								
Miami	0	2	2	1	0	1	0	0
Tampa	1	1	3		0	0	1	0

City reports for week ended March 12, 1932—Continued

Division, State, and city	Chicken pox, cases reported	Diphtheria		Influenza		Measles, cases reported	Mumps, cases reported	Pneumonia, deaths reported
		Cases, estimated expectancy	Cases reported	Cases reported	Deaths reported			
EAST SOUTH CENTRAL								
Kentucky:								
Covington	0	0	0		1	0	0	0
Lexington	4		1	4	0	0	10	5
Tennessee:								
Memphis	6	3	2		2	8	0	9
Nashville	1	1	5		1	0	0	6
Alabama:								
Birmingham	1	2	1	6	0	1	5	10
Mobile	0	0	0		0	0	0	4
Montgomery	2	1	0			1	3	
WEST SOUTH CENTRAL								
Arkansas:								
Fort Smith		0						
Little Rock	2	0	0		0	0	11	5
Louisiana:								
New Orleans	0	13	21	2	1	0	0	10
Shreveport	3	0	2		0	28	3	2
Oklahoma:								
Muskogee	0		0	56	0	14	2	0
Texas:								
Dallas	8	6	8	29	2		0	12
Fort Worth	21	4	2		2	0	0	8
Galveston	0	1	1		0	0	0	0
Houston	4	5	9		0	2	0	5
San Antonio	0	3	0		8	0	0	10
MOUNTAIN								
Montana:								
Billings	1	0	0		0	2	0	0
Great Falls	5	0	0		1	1	0	1
Helena	1	0	0		0	3	0	0
Missoula	0	0	0	59	0	0	0	1
Idaho:								
Boise	0	0	0		0	0	0	1
Colorado:								
Denver	16	8	3		2	49	62	19
Pueblo	32	0	0		0	1	0	0
New Mexico:								
Albuquerque	1	0	0		0	89	7	2
Arizona:								
Phoenix	0		0		0	0	0	2
Utah:								
Salt Lake City	32	2	0		0	0	1	2
Nevada:								
Reno	0	1	0		0	3	0	0
PACIFIC								
Washington:								
Seattle	26	4	0			393	8	
Spokane	7	1	2			0	0	
Tacoma	24	1	0		0	23	0	5
Oregon:								
Portland	16	6	1	2	2	36	13	10
California:								
Los Angeles	167	34	20	100	3	7	5	19
Sacramento	38	1	0		0	108	0	16
San Francisco	92	12	1	4	0	102	12	11

City reports for week ended March 12, 1932—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
NEW ENGLAND											
Maine:											
Portland	4	2	0	0	0	1	0	0	0	8	35
New Hampshire:											
Concord	1	0	0	0	0	0	0	0	0	0	8
Manchester	2	10		0	0	0	0	0	0	0	10
Nashua	0	3	0	0	0	0	0	0	0	0	
Vermont:											
Barre	0	0	0	0	0	1	0	0	0	3	7
Burlington	0	2		1	0	0	0	0	0	0	14
Massachusetts:											
Boston	90	155	0	0	0	12	1	0	0	35	257
Fall River	5	4	0	0	0	3	0	0	0	4	22
Springfield	10	10	0	0	0	2	0	0	0	4	32
Worcester	10	51	0	0	0	0	0	0	0	21	59
Rhode Island:											
Pawtucket	4	0	0	0	0	0	0	0	0	0	21
Providence	15	32	0	0	0	0	0	0	0	24	70
Connecticut:											
Bridgeport	13	9	0	0	0	1	0	0	0	5	37
Hartford	8	9	0	0	0	3	0	0	0	13	53
New Haven	6	24	0	0	0	0	0	0	0	12	44
MIDDLE ATLANTIC											
New York:											
Buffalo	28	133	0	0	0	6	1	0	0	20	169
New York	320	1,107	0	0	0	118	7	5	0	127	1,985
Rochester	11	102	0	0	0	7	0	0	0	3	94
Syracuse	13	27	0	0	0	0	0	0	0	71	52
New Jersey:											
Camden	5	46	0	0	0	2	0	0	0	4	52
Newark	41	47	0	0	0	12	0	0	0	27	130
Trenton	4	7	0	0	0	1	0	0	0	6	55
Pennsylvania:											
Philadelphia	97	267	0	0	0	30	1	1	0	261	529
Pittsburgh	31	61	0	0	0	14	0	0	0	50	244
Reading	5	9	0	0	0	0	0	0	0	20	40
Scranton		37		0				0		2	
EAST NORTH CENTRAL											
Ohio:											
Cincinnati	29	43	1	0	0	13	0	0	0	14	142
Cleveland	59	65	1	0	0	15	1	0	0	164	231
Columbus	12	10	1	7	0	3	0	0	1	55	86
Toledo	14	4	0	0	0	5	1	0	0	69	87
Indiana:											
Fort Wayne	5	5	0	0	0	1	0	0	0	1	39
Indianapolis	17	11	8	2	0	1	0	0	0	34	
South Bend	2	5	1	0	0	1	0	0	0	0	18
Terre Haute	3	3	0	0	0	0	0	0	0	0	13
Illinois:											
Chicago	149	191	1	0	1	39	1	1	0	167	703
Springfield	3	11	0	0	0	0	0	0	0	9	17
Michigan:											
Detroit	129	230	2	0	0	28	0	6	1	75	370
Flint	15	8	1	0	0	3	0	0	0	9	37
Grand Rapids	12	5	0	0	0	1	0	0	0	1	35
Wisconsin:											
Kenosha	4	2	0	0	0	0	0	0	0	1	11
Madison	6	3	0	0			0	0		8	
Milwaukee	31	53	0	0	0	11	0	0	0	120	129
Racine	3	0	0	0	0	0	0	0	0	1	11
Superior	3	0	0	0	0	0	0	0	0	0	8
WEST NORTH CENTRAL											
Minnesota:											
Duluth	9	1	0	0	0	0	0	0	0	0	16
Minneapolis	41	42	0	0	0	2	0	0	0	33	122
St. Paul	29	12	0	0	0	3	0	0	0	9	62

City reports for week ended March 12, 1932—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST NORTH CENTRAL—contd.											
Iowa:											
Davenport	3	4	2	0			0	0		0	
Des Moines	9	15	2	0			0	0		0	30
Sioux City	1	1	0	0			0	0		4	
Waterloo	2	0	0	0			0	0		5	
Missouri:											
Kansas City	27	15	0	0	0	4	0	0	0	24	115
St. Joseph	3	0	0	0	0	3	0	0	0	3	40
St. Louis	42	21	3	0	0	15	1	1	0	59	226
North Dakota:											
Fargo	3	1	0	0	0	0	0	0	0	0	7
South Dakota:											
Aberdeen	0	0	0	0			0	0		1	
Nebraska:											
Omaha	6	1	4	6	0	0	0	0	0	1	57
Kansas:											
Topeka	3	0	1	0	0	0	0	0	0	11	15
Wichita	4	0	0	0	0	1	0	0	0	0	38
SOUTH ATLANTIC											
Delaware:											
Wilmington	6	6	0	0	0	3	0	1	0	6	35
Maryland:											
Baltimore	41	92	0	0	0	16	1	0	0	77	238
Cumberland	1	2	0	0	0	0	0	0	0	7	11
Frederick	0	2	0	0	0	0	0	0	0	0	5
District of Columbia:											
Washington	28	24	1	0	0	17	0	3	0	21	172
Virginia:											
Lynchburg	0	2	0	0	0	1	0	0	0	18	10
Norfolk	1	5	0	0	0	2	0	0	0	7	
Richmond	4	12	0	0	0	3	0	0	0	7	51
Roanoke	1	1	0	0	0	2	0	0	0	0	19
West Virginia:											
Charleston	1	2	0	0	0	0	0	[1] 5	1	4	25
Huntington		0		0				0		0	
Wheeling	1	0	0	0	0	0	1	0	0	5	27
North Carolina:											
Raleigh	0	1	0	0	0	1	0	0	0	3	11
Wilmington	0	0	0	0	0	0	0	0	0	11	14
Winston-Salem	1	20	0	0	0	0	0	0	0	39	15
South Carolina:											
Charleston	1	0	0	0	0	2	0	1	0	0	21
Columbia	0	2	0	0	0	2	0	0	0	3	18
Greenville		3	1	0				0		0	
Georgia:											
Atlanta	6	1	1	0	0	5	0	1	1	2	70
Brunswick	0	0	0	0	0	1	0	0	0	0	3
Savannah	1	0	0	0	0	4	0	2	1	6	36
Florida:											
Miami	1	0	1	0	0	5	0	0	0	2	24
Tampa	0	0	0	0	0	2	1	0	0	0	38
EAST SOUTH CENTRAL											
Kentucky:											
Covington	4	0	0	0	0	2	0	0	0	0	25
Lexington		5		0	0	2		0	0	3	12
Tennessee:											
Memphis	12	7	2	5	0	9	1	1	0	16	74
Nashville	3	2	0	0	0	2	0	0	0	10	55
Alabama:											
Birmingham	3	4	1	0	0	5	0	0	0	12	66
Mobile	0	1	0	3	0	1	0	0	0	0	26
Montgomery	0	0	0	0				0		0	

[1] 4 cases nonresidents.

City reports for week ended March 12, 1932—Continued

Division, State, and city	Scarlet fever		Smallpox			Tuberculosis, deaths reported	Typhoid fever			Whooping cough, cases reported	Deaths, all causes
	Cases, estimated expectancy	Cases reported	Cases, estimated expectancy	Cases reported	Deaths reported		Cases, estimated expectancy	Cases reported	Deaths reported		
WEST SOUTH CENTRAL											
Arkansas:											
Fort Smith	0	----	0	----	----	----	0	----	----	----	----
Little Rock	2	1	0	0	0	6	0	0	0	10	13
Louisiana:											
New Orleans	11	8	0	0	0	12	2	1	1	1	150
Shreveport	1	1	1	0	0	9	0	0	0	4	37
Oklahoma:											
Muskogee	----	3	----	1	----	----	----	0	----	0	----
Texas:											
Dallas	6	6	1	0	0	3	0	0	0	2	54
Fort Worth	2	5	2	17	0	0	0	0	0	0	28
Galveston	0	1	0	0	0	1	0	1	0	0	20
Houston	2	7	3	0	0	3	0	1	0	0	65
San Antonio	1	0	0	0	0	8	0	0	0	0	81
MOUNTAIN											
Montana:											
Billings	1	0	0	0	0	0	0	1	0	0	14
Great Falls	3	1	0	0	0	0	0	0	0	1	9
Helena	0	0	0	0	0	0	0	0	0	0	7
Missoula	0	0	0	0	0	0	0	0	0	0	6
Idaho:											
Boise	0	2	1	2	0	0	0	0	0	0	6
Colorado:											
Denver	17	16	0	0	0	3	0	0	0	5	81
Pueblo	1	0	0	0	0	0	0	0	0	4	7
New Mexico:											
Albuquerque	0	0	0	0	0	4	0	0	0	0	13
Nrizona:											
Phoenix	1	1	0	0	0	1	0	0	0	0	----
Atah:											
Salt Lake City	3	0	0	0	0	3	0	0	0	0	36
Uevada:											
Reno	0	1	0	0	0	0	0	0	0	0	1
PACIFIC											
Washington:											
Seattle	11	5	3	0	----	----	0	0	----	5	----
Spokane	7	1	0	0	----	----	0	0	----	0	----
Tacoma	3	4	3	0	0	0	1	0	0	1	17
Oregon:											
Portland	6	1	13	9	0	3	1	0	0	7	77
California:											
Los Angeles	44	53	4	0	0	20	1	0	0	28	258
Sacramento	3	0	1	0	0	3	1	4	0	0	----
San Francisco	27	8	1	7	0	18	1	0	0	12	187

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
NEW ENGLAND									
Massachusetts:									
Boston	0	1	0	0	0	0	0	1	1
Connecticut:									
Bridgeport	0	0	1	0	0	0	0	0	0
Hartford	0	0	1	0	0	0	0	0	0

City reports for week ended March 12, 1932—Continued

Division, State, and city	Meningococcus meningitis		Lethargic encephalitis		Pellagra		Poliomyelitis (infantile paralysis)		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases estimated expectancy	Cases	Deaths
MIDDLE ATLANTIC									
New York:									
New York	5	6	0	0	0	0	0	0	0
New Jersey:									
Newark	1	0	0	0	0	0	0	0	0
Pennsylvania:									
Philadelphia	1	1	1	0	0	0	0	0	0
Pittsburgh	1	0	0	0	0	0	1	0	0
EAST NORTH CENTRAL									
Ohio:									
Cincinnati	0	1	0	0	0	0	0	0	0
Cleveland	2	1	0	1	0	0	0	0	0
Toledo	0	0	1	1	0	0	0	0	0
Indiana:									
Indianapolis	9	8	0	0	0	0	0	0	0
Illinois:									
Chicago	7	5	0	0	0	0	0	0	0
Michigan:									
Detroit	3	2	0	0	0	0	1	0	0
Flint	1	0	0	0	0	0	0	0	0
Wisconsin:									
Racine	1	1	0	0	0	0	0	0	0
WEST NORTH CENTRAL									
Missouri:									
Kansas City	0	1	0	0	0	0	0	0	0
St. Louis	0	1	0	0	0	0	0	0	0
SOUTH ATLANTIC									
Maryland:									
Baltimore	2	0	0	0	0	0	0	0	0
District of Columbia:									
Washington	3	0	0	0	0	0	0	0	0
West Virginia:									
Wheeling	0	0	0	1	0	0	0	0	0
South Carolina:									
Charleston	0	0	0	0	3	0	0	0	0
Georgia:									
Atlanta	3	1	0	0	0	0	0	0	0
Savannah	0	0	0	0	1	1	0	0	0
EAST SOUTH CENTRAL									
Alabama:									
Birmingham	0	0	0	0	1	0	0	0	0
WEST SOUTH CENTRAL									
Arkansas:									
Little Rock	0	0	0	0	0	1	0	0	0
Louisiana:									
Shreveport	0	0	0	0	0	1	0	0	0
Texas: [1]									
Fort Worth	0	0	0	0	0	1	0	0	0
Houston	0	0	0	1	0	0	0	0	0
PACIFIC									
Oregon:									
Portland	0	0	0	1	0	0	0	0	0
California:									
Los Angeles	1	0	0	0	0	0	0	1	1
Sacramento	1	0	0	0	0	0	0	0	0

[1] Rabies (in man), 1 case and 1 death at San Antonio, Tex.

The following table gives the rates per 100,000 population for 98 cities for the 5-week period ended March 12, 1932, compared with those for a like period ended March 14, 1931. The population figures used in computing the rates are estimated mid-year populations for 1931 and 1932, respectively, derived from the 1930 census. The 98 cities reporting cases have an estimated aggregate population of more than 34,000,000. The 91 cities reporting deaths have more than 32,400,000 estimated population.

Summary of weekly reports from cities, February 7 to March 12, 1932—Annual rates per 100,000 population, compared with rates for the corresponding period of 1931 [1]

DIPHTHERIA CASE RATES

	Week ended—									
	Feb. 13, 1932	Feb. 14, 1931	Feb. 20, 1932	Feb. 21, 1931	Feb. 27, 1932	Feb. 28, 1931	Mar. 5, 1932	Mar. 7, 1931	Mar. 12, 1932	Mar. 14, 1931
98 cities	78	67	72	68	64	70	62	73	[2] 59	65
New England	65	75	108	70	65	89	48	106	53	79
Middle Atlantic	75	53	65	64	72	56	63	61	56	67
East North Central	74	85	57	66	45	78	66	75	54	72
West North Central	89	55	85	59	66	55	49	71	74	63
South Atlantic	59	59	88	47	69	77	78	93	59	53
East South Central	87	53	75	59	46	59	35	29	46	35
West South Central	168	118	158	186	119	132	102	118	[3] 138	68
Mountain	103	78	52	35	9	87	9	61	26	26
Pacific	63	49	47	59	67	57	57	63	44	55

MEASLES CASE RATES

98 cities	438	521	533	668	571	703	698	769	[2] 672	947
New England	2,008	534	1,589	541	1,510	635	1,740	909	901	1,346
Middle Atlantic	253	398	384	652	466	645	504	874	644	1,026
East North Central	364	183	577	254	590	300	919	369	936	582
West North Central	182	1,314	197	1,087	226	874	241	643	165	595
South Atlantic	245	1,820	359	2,206	282	2,805	424	2,241	286	2,758
East South Central	17	904	12	1,134	0	1,051	17	1,045	58	1,157
West South Central	320	17	251	24	234	24	257	68	[2] 101	37
Mountain	198	687	138	1,566	250	1,210	198	1,331	509	1,462
Pacific	931	169	1,125	243	1,296	223	1,313	347	1,205	357

SCARLET FEVER CASE RATES

98 cities	385	348	417	346	441	373	475	345	[2] 482	375
New England	630	683	738	589	673	606	666	527	709	589
Middle Atlantic	546	322	631	342	694	381	777	359	799	389
East North Central	385	375	356	353	372	364	382	346	382	399
West North Central	235	474	241	497	248	509	231	492	178	518
South Atlantic	239	320	231	305	284	364	312	354	327	311
East South Central	127	382	75	534	121	558	87	405	81	482
West South Central	49	105	86	139	56	125	66	71	[2] 81	95
Mountain	172	400	267	296	172	305	155	305	172	400
Pacific	109	123	128	94	124	145	158	122	135	96

See footnotes at end of table.

Summary of weekly reports from cities, February 7 to March 12, 1932—Annual rates per 100,000 population, compared with rates for the corresponding period of 1931 [1]—Continued

SMALLPOX CASE RATES

	Week ended—									
	Feb. 13, 1932	Feb. 14, 1931	Feb. 20, 1932	Feb. 21, 1931	Feb. 27, 1932	Feb. 28, 1931	Mar. 5, 1932	Mar. 7, 1931	Mar. 12, 1932	Mar. 14, 1931
93 cities	4	18	4	20	4	20	4	13	[2] 5	19
New England	2	0	5	0	5	0	10	0	0	0
Middle Atlantic	0	0	0	3	1	0	0	0	0	0
East North Central	1	10	1	13	1	11	7	15	5	9
West North Central	11	84	13	128	19	128	6	57	11	132
South Atlantic	0	0	0	2	0	0	6	0	0	0
East South Central	6	12	29	18	17	23	17	23	46	0
West South Central	20	132	7	51	7	64	7	47	[2] 0	61
Mountain	17	0	0	44	0	9	0	17	17	17
Pacific	17	29	21	22	13	39	4	12	13	41

TYPHOID FEVER CASE RATES

93 cities	6	3	3	4	5	7	6	4	[2] 5	3
New England	2	2	0	0	2	5	5	5	0	0
Middle Atlantic	3	2	4	3	4	6	4	3	3	2
East North Central	2	1	3	0	4	3	6	1	1	2
West North Central	9	2	0	4	2	11	0	11	2	0
South Atlantic	16	0	10	10	16	22	20	12	25	6
East South Central	58	29	6	0	12	6	17	18	6	18
West South Central	3	14	3	7	7	14	16	0	[2] 10	14
Mountain	0	0	0	9	0	0	0	0	9	0
Pacific	10	10	2	12	6	4	0	2	8	4

INFLUENZA DEATH RATES

91 cities	17	59	20	60	34	50	37	44	37	34
New England	17	46	7	43	14	24	17	19	19	36
Middle Atlantic	13	49	13	42	39	40	42	32	47	23
East North Central	15	56	18	61	37	61	41	48	39	28
West North Central	26	56	49	68	29	74	32	59	15	50
South Atlantic	18	119	18	123	31	79	33	73	39	57
East South Central	44	64	25	140	44	76	13	140	25	102
West South Central	44	159	50	97	24	45	71	52	37	55
Mountain	60	17	78	61	69	17	34	44	26	35
Pacific	7	14	14	26	14	41	12	34	7	38

PNEUMONIA DEATH RATES

91 cities	133	218	154	218	157	212	189	194	193	191
New England	117	291	120	276	192	236	192	185	194	147
Middle Atlantic	124	254	162	236	184	217	221	229	250	214
East North Central	108	182	133	187	110	192	158	154	131	139
West North Central	244	124	285	147	244	218	241	218	215	159
South Atlantic	174	348	163	340	173	313	196	265	224	332
East South Central	182	166	144	267	138	274	169	229	182	242
West South Central	121	176	165	228	108	221	172	149	148	211
Mountain	172	183	198	200	224	191	198	131	207	235
Pacific	137	72	91	70	104	91	102	101	118	125

[1] The figures given in this table are rates per 100,000 population, annual basis, and not the number of cases reported. Populations used are estimated as of July 1, 1932 and 1931, respectively.

[2] Fort Smith, Ark., not included.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—Week ended March 5, 1932.—The Department of Pensions and National Health of Canada reports cases of certain communicable diseases for the week ended March 5, 1932, as follows:

Province	Cerebro-spinal fever	Influenza	Lethargic encephalitis	Poliomyelitis	Smallpox	Typhoid fever
Prince Edward Island [1]						
Nova Scotia		58				
New Brunswick [1]						
Quebec					8	18
Ontario		103	2	1	1	1
Manitoba	1			1		1
Saskatchewan					7	1
Alberta						2
British Columbia					3	3
Total	1	161	2	2	19	26

[1] No case of any disease included in the table was reported during the week.

Quebec Province—Communicable diseases—Week ended March 5, 1932.—The Bureau of Health of the Province of Quebec, Canada, reports cases of certain communicable diseases for the week ended March 5, 1932, as follows:

Disease	Cases	Disease	Cases
Chicken pox	102	Measles	457
Diphtheria	31	Scarlet fever	78
Erysipelas	12	Smallpox	8
German measles	27	Typhoid fever	18
Gonorrhea	5	Whooping cough	52

Quebec Province [1]—Deaths from certain diseases—Year 1930.—During the year 1930 deaths from certain diseases were reported in the Province of Quebec, Canada, as follows:

Disease	Deaths	Disease	Deaths
Bronchitis	159	Measles	273
Cancer	2,346	Mumps	29
Cerebrospinal meningitis	104	Pneumonia	1,172
Chicken pox	5	Poliomyelitis	24
Diabetes	305	Scarlet fever	311
Diphtheria	610	Smallpox	172
Dysentery	63	Syphilis	195
Erysipelas	57	Tetanus	6
German measles	1	Tuberculosis	3,350
Influenza	409	Typhoid and paratyphoid fever	258
Lethargic encephalitis	2	Whooping cough	410

[1] Other vital statistics for the Province of Quebec, Canada, will be found in the Public Health Reports Mar. 11, 1932, pp. 634, 635.

Saskatchewan—Vital statistics.—According to information published by the Department of Public Health of the Province of Saskatchewan, Canada, births and deaths were reported in the Province, in 1930, as follows:

Number of births	22,051	Number of deaths	6,309
Birth rate per 1,000 population	25.0	Death rate per 1,000 population	7.2
Number of stillbirths	547	Deaths under 1 year per 1,000 live births	72.6

Estimated population of the Province, 1930: 882,000.

Cases of certain diseases, with deaths and death rates per 100,000 population, were reported during 1930 in the Province of Saskatchewan, as follows:

Disease	Cases	Deaths	Death rate per 100,000 population	Disease	Cases	Deaths	Death rate per 100,000 population
Cerebrospinal meningitis		25	2.8	Pneumonia		354	40.1
Chicken pox	1,575	1	0.1	Scabies	121		
Diphtheria	300	69	7.8	Scarlet fever	683	10	1.1
Dysentery (bacillary)	25	28	3.2	Septicemia		19	2.2
Erysipelas	28	18	2.0	Smallpox	375		
German measles	111			Syphilis		17	1.9
Influenza		158	17.9	Tetanus		3	0.3
Leprosy	1			Trachoma	2		
Lethargic encephalitis	2	5	0.6	Tuberculosis		407	46.1
Measles	1,249	18		Typhoid fever	98	29	3.3
Mumps	427	2	0.2	Undulant fever	1		
Poliomyelitis	70	21	2.4	Whooping cough	689	54	6.1

DENMARK

Communicable diseases—November, 1931.—During the month of November, 1931, cases of certain communicable diseases were reported in Denmark as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	3	Paratyphoid fever	73
Chicken pox	20	Poliomyelitis	5
Diphtheria and croup	345	Puerperal fever	21
Erysipelas	268	Scabies	1,018
German measles	2	Scarlet fever	256
Gonorrhea	880	Syphilis	97
Influenza	4,801	Tetanus	3
Lethargic encephalitis	9	Typhoid fever	23
Measles	1,870	Undulant fever (Bact. abort. Bang)	37
Mumps	152	Whooping cough	2,410

IRISH FREE STATE

Vital statistics—Year 1930.—The following vital statistics for the year 1930 are taken from a report of the registrar general for that year:

Population, estimated	2,946,009	Infant mortality rate	69
Births	58,353	Deaths from—	
Birth rate per 1,000 population	19.8	Cancer	3,329
Deaths	41,702	Tuberculosis	3,825
Death rate per 1,000 population	14.2	Rate per 1,000 population	1.3
Marriage rate per 1,000 population	4.6		

ITALY

Communicable diseases—Four weeks ended November 15, 1931.—During the four weeks ended November 15, 1931, cases of certain communicable diseases were reported in Italy as follows:

Disease	Oct. 19-25		Oct. 26-Nov. 1		Nov. 2-8		Nov. 9-15	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	38	35	32	26	25	22	25	24
Cerebrospinal meningitis	14	14	6	6	8	7	8	8
Chicken pox	131	68	168	79	199	75	298	106
Diphtheria and croup	586	307	589	311	533	287	686	350
Dysentery	11	7	7	3	26	12	12	8
Lethargic encephalitis	1	1	1	1	4	4		
Measles	625	145	734	146	816	157	1,057	186
Poliomyelitis	21	18	19	15	12	7	11	10
Scarlet fever	579	219	582	203	523	175	636	203
Typhoid fever	601	357	615	323	563	317	746	382

JAMAICA

Communicable diseases—Four weeks ended February 27, 1932.—During the four weeks ended February 27, 1932, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island of Jamaica, outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chicken pox	19	20	Puerperal fever		1
Dysentery		2	Tuberculosis	34	79
Leprosy		1	Typhoid fever	8	55

LATVIA

Communicable diseases—January, 1932.—During the month of January, 1932, cases of certain communicable diseases were reported in Latvia, as follows:

Disease	Cases	Disease	Cases
Botulism	1	Measles	26
Cerebrospinal meningitis	3	Mumps	163
Diphtheria	71	Scarlet fever	43
Erysipelas	26	Trachoma	95
Influenza	91	Typhoid fever	38
Leprosy	2	Whooping cough	170

PORTO RICO

Vital statistics—Year 1930.—According to information published by the Health Department of Porto Rico, births and deaths were reported on the island during the year 1930, as follows:

Number of births	54,574	Number of deaths	28,870
Birth rate per 1,000 population	35.2	Death rate per 1,000 population	18.6
Number of stillbirths	5,089	Deaths under 1 year per 1,000 live births	126
Stillbirth rate per 1,000 births (including stillbirths)	85.3	Maternal mortality per 1,000 total births	5.64

The following table gives the numbers of deaths from certain causes, together with death rates per 100,000 population, in Porto Rico, for the year 1930:

Cause of death	Number of deaths	Death rate per 100,000 population
Arteriosclerosis	278	17.9
Bronchitis	892	57.5
Broncho-pneumonia	1,518	97.9
Cancer	559	36.1
Congenital debility	1,305	84.2
Diarrhea and enteritis (under 2 years)	3,022	195.0
Diarrhea and enteritis (2 years and over)	2,049	132.2
Dysentery	102	6.6
Heart disease	1,597	103.0
Influenza	51	3.3
Malaria	1,887	121.7
Meningitis (simple)	180	11.6
Nephritis	2,074	133.8
Pneumonia (all forms)	1,171	75.5
Puerperal septicemia	149	9.6
Septicemia	266	17.2
Syphilis	211	13.6
Tetanus	501	32.3
Tuberculosis (all forms)	4,080	263.2
Typhoid fever	132	8.5
Uncinariasis	367	23.7

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Hygiene, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following tables must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Week ended—															
		Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Oct. 18–Nov. 14, 1931	Nov. 15–Dec. 12, 1931	December, 1931		January, 1932					February, 1932				March, 1932	
						19	26	2	9	16	23	30	6	13	20	27	5	12
Ceylon: Colombo	C				3													
	D				3													
China:																		
Canton	C	2			3													1
Hankow	C		8	23	14				2	1								
	D		6	1	6				1									
Shanghai	C	125	88	8														
	D	9	13	4														
Swatow	C						1											
India	C	39,223	26,705	15,722	14,314		3,181	4,004	3,885	2,953								
	D	21,683	13,257	8,801	7,467		1,640	2,004	2,022	1,590								
Bombay	C	42	4	5	4			1								1		
	D	17	3	1	6			1								1		
Calcutta	C	46	51	74	74	11	19	10	18	25	26	41	41	37	21	19	41	
	D	15	23	37	42	6	8	5	6	13	14	23	20	18	12	9	15	
Chittagong	C		1							1			5		1			
	D												1	1	1			
Madras	C	5											1	1	1			
Negapatam	C	1																
Rangoon	C		1	1				1										
	D		1	1				1										
India (French):																		
Chandernagor	C	2	1	1		2			1									
	D	2	1	1		2			1									
Karikal	C	2	1							12	11	12		2				
	D	2								5	7	5						
Pondicherry	C	4	1							4	11							
	D	2								4	11							
India (Portuguese)	C	34	75	48	3	1												
	D	18	26	11	3	1												

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Oct. 18–Nov. 14, 1931	Nov. 15–Dec. 12, 1931	Week ended— December, 1931		January, 1932					February, 1932				March, 1932	
						19	26	2	9	16	23	30	6	13	20	27	5	12
Indo-China (see also table below):																		
Pnompenh	C	2	1	4							1	1						
	D	2	1								1	1						
Saigon and Cholon	C		1		P	1		1			1						1	
	D		1															
Iraq:																		
Abulkhasib	C	6																
	D	5																
Amara	C	66	4	5	3	2	P											
	D	59	1	3	4	2												
Amara Province	C	96	95	35	3													
	D	120	83	24	2													
Basra	C	293	157	78														
	D	154	84	36														
Basra Province	C	53	42	10														
	D	30	19	5														
Dinwaniyah	C		1															
Dinwaniyah Province	C		61	23														
	D		44	15														
Iwaniyah	C		23															
	D		15															
Kut Province	C			20														
	D			14														
Muntafiq Province	C	225	209	68	2													
	D	145	160	51	3													
Nasiriyah	C	88	33	24	8													
	D	75	28	18	7													
Suqelshuyukh	C	2																
	D	2																
Japan: Taiwan—Kelung	C			2														
Persia:																		
Abadan	C		1	3	1													

Place		August, 1931	September, 1931	October, 1931	November, 1931	December, 1931			January, 1932			February, 1932		
						1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-29
Persia:														
Abadan	C		1	3	1									
Ahwaz	C		12	103	47									
	D		7	98	39									
Khorramabad	C				159	2	1							
	D				115	9	1							
Mohammerah	C		1											
Philippine Islands: [1] Capiz Province	C	35	79	12	27	13	4	4	5		13	9	13	10
	D	16	59	9	19	10	3	3	3		10	8	12	8
Siam	C	1												
	D	1												
Ayudhaya Province	C				1					1				
	D				1					1				
Bangkok	C	1			1					1				1
	D				1					1				
On vessel:														
S. S. Kasagi Maru, at Moji, from Shanghai	C	1												
S. S. Ankoo, at Nagasaki, from Shanghai	C	2												
	D	1												
Indo-China (French) (see also table above):														
Annam [2]	C											4		
	D											4		
Cambodia [2]	C	12	14	19	4		2	1	1	9	2	3	2	
	D	2	7	18			1	1	1	2	2	2	2	
Cochin-China [2]	C	39	18	14	6	8	3	3	2	1	2	7		P
	D	32	13	13	4	5	2		1	1	2	5		

[1] Figures for cholera in the Philippine Islands are subject to correction.
[2] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE

[C indicates cases; D, deaths; P, present]

Place		Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Oct. 18–Nov. 14, 1931	Nov. 15–Dec. 12, 1931	Week ended— December, 1931: 19	26	January, 1932: 2	9	16	23	30	February, 1932: 6	13	20	27	Mar. 5, 1932
Argentina: Cordoba Province [1]	C						1						1				
Azores:																	
San Miguel Island	C				5												
	D				1												
Terceira Island	C				16												
	D				6				1								
Belgian Congo	C									10							
British East Africa (see also table below):																	
Tanganyika	C	4	13							10							
	D	4	5														
Uganda	C	289	276	218	145	28	13	9	13		14	10					
	D	207	270	211	138	24	15	10	13		14	6					
Canary Islands: Palma Island—Los Lanos	C									8							
	D									5	3						2
Ceylon: Colombo	C	3	4		1				4	1	2		1		1	1	1
	D	3	3		1				4	1	2				1	1	
Plague-infected rats					1				1	1							
Chile: Santiago	C				1												
	D				1												
Plague-infected rats																	
China: [1]																	
Shansi Province [1]	C				P											P	
Shensi Province	C				P												
Dutch East Indies:																	
Java—																	
Surabaya	C									1	1						
	D									1	1				1		
Tegal	C																
	D																
Java and Madura	C	233	325	512	702	179	151	136	121	102	127						
West Java	D	65	113	139	198	64	54	39	46	34	48	54					
		65	113	139	198	64	54	39	46	34	48	54					

Place		Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Oct. 18–Nov. 14, 1931	Nov. 15–Dec. 12, 1931	Week ended— December, 1931: 19	26	January, 1932: 2	9	16	23	30	February, 1932: 6	13	20	27	Mar. 5, 1932
Ecuador (see table below)																	

Ecuador (see table below).																		
Egypt:																		
Alexandria	C	5	1	6	3					1	1					1	1	
	D	2		2	3													
Assiout	C				1	1	1					1						
	D				1	1	1					1						
Beheira	C	2									1	10						
Dakahlia	C										1	1						
Girga	C				2	1												
	D				2	1												
Kena	C				4			1	1									
	D				3			1	1									
Minieh	C			4	2	1		3	3			1						
	D			2		1		3	3			1						
Port Said	C			2	4		1											
	D				2		1											
Tanta	C	2			2							1						
	D				2							1						
France: Rouen—Devilleles	C																	
Hawaii Territory:																		
Hamakua—Honokaa	C														1	1		
	D														1	1		
Plague-infected rats																1		
Maui Island—																		
Haliimaile—Plague-infected rats		1																
Makawao	C																	1
	D																	1
Plague-infected rats		1													4			
Paia—Plague-infected rats			1															
Paaulo—Plague-infected rats				1														
India	C	1,832	2,550	2,493	4,235	1,131	1,256	1,195	2,416	1,731								
	D	772	1,147	1,170	1,739	526	575	715	1,096	840								
Bassein	C	4	1	1								1			1	1	1	1
	D	4	1	1											1	1	1	1
Bombay	C		1	1	1										1		2	2
	D		1		1										1		2	2
Plague-infected rats		57	42	22	56	17	7	9	9	8	18	14	17	21	27	30	31	
Madras Presidency	C	376	185	91	57	30	76	63		87	99	87	22	24			10	
	D	162	105	40	24	3	26	30		58	54	35	14	15			5	
Moulmein	C	5																
	D	9	2															
Rangoon	C	3		5	1		1	1		1	2	2		1	4	3	1	
	D	2		1	1		1	1			1				4	3	1	
Plague-infected rats		4	4	1	2		1	1								1	1	

[1] 10 cases of bubonic plague were reported in Cordoba Province, Argentina, in January, 1932. They were distant from railroad and 500 kilometers from ports.
[2] On Sept. 19, 1931, 18 deaths from plague were reported in Changchuanpu, China, and new cases in Kaitung and Fengtien.
[3] On Oct. 17, 1931, plague epidemic was reported in western Shansi Province, China, with 2,000 deaths in Hsinghsien.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Oct. 18–Nov. 14, 1931	Nov. 15–Dec. 12, 1931	Week ended— December, 1931		January, 1932					February, 1932				Mar. 5, 1932
						19	26	2	9	16	23	30	6	13	20	27	
Indo-China (see table below).																	
Iraq:																	
Baghdad	C	3	------	2	7	1	------	------	1	2	1	1	1	1	1	------	1
	D	1	------	------	2	------	------	------	------	------	------	------	------	------	------	------	------
Maudhan	C	------	------	3	2	------	------	------	------	------	------	------	------	------	------	------	------
	D	------	------	1	1	------	1	------	------	------	------	------	------	------	------	------	------
Madagascar (see also table below): Tamatave	C	2	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Morocco	C	------	18	2	11	------	------	------	------	------	------	------	------	------	------	------	------
	D	------	8	6	------	------	------	------	------	------	------	------	------	------	------	------	------
Peru (see table below).																	
Senegal (see table below).																	
Siam	C	4	4	5	5	1	------	------	P	1	------	------	------	------	------	------	1
	D	3	3	2	2	1	------	------	------	1	------	------	------	------	------	------	------
Spain: Hospitalet—Barcelona Province	C	2	2	7	------	------	------	------	------	------	------	------	------	------	------	------	------
	D	1	1	1	------	------	------	------	------	------	------	------	------	------	------	------	------
Syria: Beirut	C	2	3	1	------	------	------	------	------	------	------	------	------	------	------	------	------
Tunisia: Tunis	C	1	1	------	------	------	------	------	------	------	------	------	------	------	------	------	------
Union of South Africa: Orange Free State	C	P	P	------	P	------	------	P	------	P	P	------	2	------	------	------	------

Place		August, 1931	September, 1931	October, 1931	November, 1931	December, 1931	January, 1932	February, 1932
British East Africa (see also table above): Kenya	C	235	14	64	44	41	17	------
Ecuador:								
Province—								
Chimborazo	C	------	13	2	8	------	8	13
Loja	C	------	4	11	2	------	11	------
Indo-China	C	------	4	3	------	9	16	1
	D	------	4	1	------	5	9	1
Madagascar (see also table above):								
Ambositra Province	C	2	1	8	39	142	------	------
	D	1	1	5	37	121	------	------
Antisirabe Province	C	22	19	17	27	56	------	------
	D	22	19	17	27	51	------	------
Maevatanana Province	C	------	------	------	4	------	------	------
	D	------	------	------	4	------	------	------
Miarinarivo Province	C	20	14	18	10	14	------	------
	D	19	12	16	9	14	------	------
Moramanga Province	C	3	12	13	25	30	------	------
	D	3	11	11	25	29	------	------
Tananarive Province	C	45	65	120	186	248	------	------
	D	44	63	117	178	241	------	------
Peru	C	19	2	8	27	21	11	------
	D	14	2	7	11	9	------	------
Departments—								
Canete	C	------	------	------	------	------	3	------
Cajamarca	C	------	------	------	14	------	------	------
	D	------	------	------	5	------	------	------

Place		August, 1931	September, 1931	October, 1931	November, 1931	December, 1931	January, 1932	February, 1932
Peru—Continued.								
Departments—Continued.								
Lambayeque	C	------	1	------	------	------	------	------
	D	------	1	------	------	------	------	------
Libertad	C	------	------	------	2	------	1	------
Lima	C	------	1	------	9	------	6	------
	D	------	1	------	4	------	------	------
Plague-infected rats		------	------	1	------	------	------	------
Lima	C	------	------	------	1	------	------	------
	D	------	------	------	1	------	------	------
Piura	C	------	------	8	------	------	1	------
	D	------	------	7	------	------	------	------
Senegal:								
Baol [1]	C	101	13	6	2	------	------	------
	D	58	8	2	------	------	------	------
Dakar [1]	C	194	45	4	------	------	------	------
	D	106	31	4	------	------	------	------
Dicurbel [1]	C	------	13	------	10	------	------	------
	D	------	5	------	5	------	------	------
Louga [1]	C	2	10	1	19	------	------	------
	D	1	4	2	10	------	------	------
Rufisque [1]	C	2	1	7	12	------	------	------
	D	------	------	1	2	------	------	------
Thies [1]	C	26	12	7	16	1	------	------
	D	16	8	5	7	1	------	------
Yombel [1]	C	------	------	------	------	------	------	1

[1] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Oct. 18–Nov. 14, 1931	Nov. 15–Dec. 12, 1931	Week ended— December, 1931		January, 1932					February, 1932				March, 1932	
						19	26	2	9	16	23	30	6	13	20	27	5	12
Aden	C												2					
Algeria:																		
Algiers	C			1		1												
Constantine	C	1																
Southern Territories	C													2				
Brazil:																		
Porto Alegre (alastrim)	C	48	46	57	51		14	8	13	7	4	17	6					
	D	4	2	3	1		1		1									
Rio de Janeiro	C						1											
Santos	C				1					2								
British East Africa: Tanganyika	C	50	1,184	18	2				55	4		8	12					
	D	5	97	2					4			5	2					
British South Africa:																		
Northern Rhodesia	C		1						7		5							
Southern Rhodesia	C	3							1									
Canada:																		
Alberta	C		12	6	3	9		2										
British Columbia [1]	C	2		2					2	1	4	8	5	8	10	4	3	
Manitoba	C	1			2						5		5					
Winnipeg	C	1																
Nova Scotia	C				1											1		
Ontario	C	6	17	15	11	10		2	2	3	2		1	4	16			1
Kingston	C	1																
North Bay	C									1								
Ottawa	C	1	8	12														
Toronto	C				1													
Quebec	C							2	1		1						8	
Saskatchewan	C	33	11	33	34			1	10	21	7		7		23		7	
Regina	C		2															
Chile:																		
Santiago	C			3														
	D			2														
Tocopilla	C							2										
China:																		
Amoy	C	1	2	8	46	60	66	49	43	37	60	54	32	35	34	30	22	15
	D	1	1	6	36	22	20	19	18	14	28	20	29	11	14	12	7	5
Canton	C	1		2	14	6	3	5	4	3	11	5	8	18	6	5	15	

Canton	C	1		2	14	6	3	5	4	3	11	5	8	18	6	5	15	
Foochow	C	P	P	P	P		P		P		P		P					
Hankow	C		1	18	29	1	6	34	6	11	32	15	1					
	D				6	1	1	7	3	1		2	2					
Hong Kong	C								1	1		4	6	7	19	19	6	12
	D									1		1	4	2	9	9	3	7
Manchuria—Dairen	C				1								1	1				
Nanking	C				2													
	D				1													
Shanghai—																		
Foreigners only	C		98	21	77	16	40	18	41	43	48	40	32	48	30	44	45	
Including natives	D	2	13	2	31	8	13	6	14	11	21	17	13	24	18	17	8	
Swatow	C							2										
Tientsin	C				1								1					
Chosen (see table below).																		
Colombia:																		
Cali	C					1												
Santa Marta	D	1																
Dutch East Indies: Batavia	C					1							1					
	D												1					
Egypt:																		
Cairo	C									1								
Suez	C																2	3
Eritrea	C	10																
	D	2																
France (see table below).																		
Germany: Aix-la-Chapelle	C										1							
Great Britain:																		
England and Wales	C	97	161	220	216	44	32	54	68	68	55	55	49	70	73	73	42	
London	C	32	58	129	118	18	14	28	40	24	36	22	18	44	38	32	22	
London and Great Towns	C	88	128	179	191	31	22	43	56	60	45	37	46	59	57	53	34	
Honduras: [2]																		
Ceiba	C		14														1	
Puerto Castilla	C		1	1		1		1	1			1			1	2	1	
Tegucigalpa	C				8													
Trujillo	C	1	1	1														
India	C	1,705	1,451	1,152	2,298	362	426	619	954	795								
	D	433	224	246	1,066	84	96	110	174	180								
Bassein	C										1		2					
Bombay	C	5			1	2			1	3	1	3	1	3	2	5	13	
	D				1	1			1			2		2	1	1	6	
Calcutta	C	5	1	1	1		1	1	5	7	3	7	10	9	25	35	33	
	D	5	1	1	1		1	1	1	3	1	3	8	6	7	18	23	
Cochin	C		8	5							1			1	1	4	3	
Karachi	C			1	5	2	1			2	2	12	2	9	11	3		
	D									2	1	2	1		5	3		
Madras	C	1	13	5	7	1	2	3	1	1	3	3	2	4	2	2	7	
	D		2		2		1	1			2	1			3		1	
Moulmein	C									1			3	2			2	

[1] 23 cases of smallpox with 8 deaths were reported at Vancouver, British Columbia, from Jan. 1 to Feb. 18, 1932.
[2] 500 cases of smallpox with 15 deaths were reported in Honduras from July, 1931, to Feb. 16, 1932.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Oct. 18–Nov. 14, 1931	Nov. 15–Dec. 12, 1931	Week ended— December, 1931		January, 1932					February, 1932				March, 1932	
						19	26	2	9	16	23	30	6	13	20	27	5	12
India—Continued.																		
Negapatam	C	4	2	1	1											1		
	D		1	1	1													
Rangoon	C	2	3	3	9	4	4	18	13	15	35	58	39	141		104	173	
	D	1	2	1	7	1		2	7	7	8	15	10	18	46	29	34	
Tuticorin	C	2	4	5	8	2	2		2		19	9		9	5	15	7	
	D		1	1							2			2	1		5	
Vizagapatam	C	6	6						2						1	1	1	
	D	6	1															
India (French):																		
Karikal	C	7	8	4	7			4				1						
	D	3	4	3	7			2				1						
Pondicherry Province	C	26	23	38	26	10	7	1	4	4	11	4	13	8	4	4	4	
	D	24	21	36	25	10	7	1	4	4	6	4	13	8	4	4	4	
Indo-China (see also table below):																		
Pnompenh	C										1			2				
Saigon and Cholon	C	6	6	7	26	13	8	3	8	23	28	43	23	38	46	33	28	
	D	3	3	5	12	9	6	2	7	18	22	35	17	24	23	23	15	
Iraq:																		
Baghdad	C	1			11	3	4	4	4	5	2	2	1	2	1	1		1
	D				5	1	2	2	3	9	2	2		2	1	1		1
Basra	C								1		1	1		1	1			
	D								2									
Mosul Liwa	C		5															
Ivory Coast (see table below).																		
Jamaica	C				1													
Japan:																		
Kobe	C																1	
Taiwan	C											20			55			
Yokohama	C				1				1	2								
Mexico (see also table below):																		
Chihuahua	D													1		1		
Jalisco (State)—Guadalajara	D		4	2	1	1				2			1					1
Mexico City and surrounding territory	C	5	7	5	10	6			2		3	6	5	7				
	D	2	4	1														
Monterrey	C			2						1					1	2	5	1
San Luis Potosi	D							1	1	2	1	2			1	1	2	

Monterrey	C			2						1					1	2	5	1
San Luis Potosi	D						1	1	2	1	2			1			1	2
Torreon	C	2	1		7			2	2		3	1					2	
	D	1						2	1			1	1				2	
Morocco (see table below).																		
Netherlands: Friesland—Opsterland	C			[1]1														
Nigeria	C		454	69	15						36							
	D		141	15	1						13							
Panama: Chiriqui	C				3													
Poland	C	1		2	1	1												
Portugal:																		
Lisbon	C	66	48	78	91	35	14	26	33	38	22	31	7	21	5	17	7	
Oporto	C				2	1			1	2			1	4	1	1	8	
Rumania (see table below).																		
Siam	C	3				8			5		1							1
Straits Settlements	C						2						4		1		2	
Sudan (Anglo-Egyptian)	C	32			2				2			3				3	5	1
	D	6											1				1	
Sweden: Malmo	C											9						
Syria (see table below).																		
Tunisia: Tunis	C								1									
Union of South Africa:																		
Cape Province	C			P	P	P	P	P	P									
Natal	C	P																
Orange Free State	C	P	P															
Transvaal	C			P	P													
On vessel:																		
Brazilian ship Jaboatao at New Orleans from Brazil	C							1										
S. S. Tacoma at Manila from Shanghai	C								1									
S. S. Cressington Court at Yokohama from Shanghai	C									1								
S. S. Bollington Court at Yokohama from Shanghai	C									1								
S. S. Victoria City at Brisbane from Shanghai	C									1								
S. S. Bellasco at Mobile, from Habana, Cuba, and Hull, England	C								1									
S. S. Fravenfels, at Suez	C																	[2]1
S. S. Uwajima Maru at Osaka from Shanghai	C												1					

Place		August, 1931	September, 1931	October, 1931	November, 1931			December, 1931			January, 1932			February, 1932	
					1-10	11-20	21-30	1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20
Indo-China (see also table above)	C	72	39	47	20	2	98	144	41	324	11	107	191	145	206
	D	26	13	16	4		18	17	21	55	11	52	85	47	98
Ivory Coast	C	7			1										
	D	4			1										
Syria: Beirut	C										2	3			

[1] Imported case.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		August, 1931	September, 1931	October, 1931	November, 1931	December, 1931	January, 1932
Chosen	C	19	9	7	2	1	1
	D	7	1	1			
France	C		4		6	1	
Mexico (see also table above)	D	731	565				
Morocco	C	23	59		91	152	279
Rumania	C	1					

Place		August, 1931	September, 1931	October, 1931	November, 1931	December, 1931	January, 1932
Mexico (see also table above)	D	731	565				
Morocco	C	23	59		91	152	279
Rumania	C	1					

TYPHUS FEVER

Place		Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Oct. 18–Nov. 14, 1931	Week ended— November, 1931		December, 1931				January, 1932					February, 1932			
					21	28	5	12	19	26	2	9	16	23	30	6	13	20	27
Algeria:																			
Algiers	C		1	2					1		3		1						3
Constantine Department	C	2	1	38	1		1	1	1		3	1	2		3	2			
Geryville	C												5		2		1		
Oran	C	1		1	1														
Bulgaria	C	1		2		2		2	1	14	1	6	16	12	13	3	1	29	36
	D								1	1	1			2	3	1		3	3
Chile:																			
Antofagasta	C			1						1					1				
Santiago	C			34	3														
China:																			
Manchuria—Harbin	C	1																	
Shanghai	C		1																
Chosen (see table below).																			
Colombia: Cali	D	1															1		
Czechoslovakia (see table below).																			
Egypt:																			
Alexandria	C	2							3		1	1					1		
Bebeira	C			1						7								63	
Cairo	C	1						1											
Gharbieh	C																		

Gharbieh	C			1						1										
	D			1																
Provinces	C										11		4		13	26	26	11	104	
	D										2				2	1	1	2	5	
Greece (see table below).																				
Guatemala (see table below).																				
Irish Free State:																				
Donegal County—Stranorlar	C							2												
Limerick County—																				
Croom	C		1																	
Glin	C	2	1																	
Limerick	C							1												
Rathkeale	C		1																	
Waterford County—Lismore	C										1									
Latvia (see table below).																				
Lithuania (see table below).																				
Mexico:																				
Guadalajara	D									1										
Mexico City, including municipalities in Federal District	C	10	14	16	7	3	5	7	4	3	3	1	5	10	4	6	7			
	D	4	8	4	1	1	1	1	2	1	1	2	1	4	2	2	1			
San Luis Potosi	D									1										1
Torreon	C		2	3																
	D		2	6																
Morocco	C		4	1			11	6	4	1	1	3		2	1	3	7	19	19	
	D							2	1											
Palestine	C	4	6	3		1			2	1		1	1	1		1		1		
Paraguay: Asuncion	D	1																		
Peru.[1]																				
Poland	C	11	14	20	16	36	32	22	68	30	46	49	69	61	74	61	49	41	58	
	D		1	3	2	2		6	5	5	3	1	4		4	2	2	3	7	
Portugal: Oporto	C	2		3											1		1			
Rumania	C	13	18	38	13	13	13	29	25	41		42	62	83	68	51				
	D	1	3	9	1	1	2	2	4	5		1	3	1	8	1				
Tunisia: Tunis	C	3		3			26			1		1				1	13		11	
	D						2										1		2	
Turkey (see table below).																				
Union of South Africa:																				
Cape Province	C	P	P	P		P	P	P	P	P	P	P	P	P		P				
Municipality of East London	C	P																		
Natal	C	1	P			P	P	P	P		P									
Orange Free State	C		P	P				P	P	P	P	P	P	P		P				
Transvaal	C	P	1	P	P	P	P	P	P	P	P	P	P	P		P				
Venezuela: Caracas (see table below).																				
Yugoslavia (see table below).																				
On vessel: At Antofagasta, from Iquique and points north	C									1										

[1] Typhus fever has been reported in Peru from May to November, 1931, 153 new cases being reported during the months of October and November. The disease has not spread to the coastal regions.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		August, 1931	September, 1931	October, 1931	November, 1931	December, 1931	January, 1932	February, 1932
Chosen: Seoul	C	33	12	24	4			
	D	5		1	1			
Czechoslovakia	C			18		10		
	D			1		3		
Greece	C	13	9	12	4	6	4	
	D	2	1			1		
Guatemala	C	3						
Latvia	C							
Lithuania	C	2		5	9			10
	D			1				
Turkey	C	5	16	11	14	21	14	
	D					2	3	
Venezuela: Caracas	D					1	2	
Yugoslavia	C	1					11	26
	D							2

YELLOW FEVER

Place		Aug. 23–Sept. 19, 1931	Sept. 20–Oct. 17, 1931	Oct. 18–Nov. 14, 1931	Week ended— November, 1931		December, 1931				January, 1932					February, 1932				Mar. 5, 1932
					21	28	5	12	19	26	2	9	16	23	30	6	13	20	27	
Brazil:																				
Alagoas State:																				
Maceio	D			1																
Utinga	C			3																
	D			2																
Bahia State	C										2									
Sobral	C			1																
	D			1																
Pernambuco State	C	2																		
	D	2																		
Pau d'Alho	C			1																
	D			1																
Recife	C			1																

Recife	C		1																	
	D		1																	
Santa Teresa (about 56 miles from Victoria)	D																			1
Gold Coast:																				
Cape Coast	C																			P
Dagomba District	C						1													
Kete Krachi	C		1																	
Oda	C	1																		
	D	1																		
Salaga	C						1													
	D						1													
Tamale	C		2	1		2	1													
	D		2																	
Ivory Coast:																				
Grand Bassam	C	1																		
	D	1																		
Tehini	C			1																
Nigeria	C			2		2												1		
	D			1		2														
Senegal:																				
St. Louis	C		1																	
Thies	C		1																	
	D		1																	
Sudan (French): Macina—Kayo Circle	C			2																
	D			2																
Togo (French): Atakpame—Anie Circle	C			1																
	D			1				1												
Upper Volta:																				
Banfora	C		2																	
	D		1																	
Dedougou	C			2																
Diarabakoko	C		2																	
	D		1																	
Ouagadougou	C	1	2																	